

1 UNITED STATES DISTRICT COURT
2 FOR THE NORTHERN DISTRICT OF OHIO
3 EASTERN DIVISION

4 IN RE: NATIONAL) MDL No. 2804
5 PRESCRIPTION OPIATE)
6 LITIGATION) Case No.
7) 1:17-MD-2804
8)
9 THIS DOCUMENT RELATES TO) Hon. Dan A.
10 ALL CASES) Polster
11)

12 Sunday, May 5, 2019
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17 HIGHLY CONFIDENTIAL - SUBJECT TO FURTHER
18 CONFIDENTIALITY REVIEW
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24 Videotaped Deposition of MEREDITH B.
25 ROSENTHAL, Ph.D., VOLUME 2, held at Robins
Kaplan LLP, 800 Boylston Street, Suite 2500,
Boston, Massachusetts, commencing at
8:04 a.m., on the above date, before
Michael E. Miller, Fellow of the Academy of
Professional Reporters, Registered Diplomate
Reporter, Certified Realtime Reporter and
Notary Public.

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VIDEOGRAPHER:

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VINCENT ROSICA,

18 Golkow Litigation Technologies

19

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1	INDEX	
2		
3	APPEARANCES	478
4		
5	PROCEEDINGS	485
6		
7	EXAMINATION OF MEREDITH B. ROSENTHAL, Ph.D.:	
8	BY MR. METZ	746
9		
10	BY MR. GEISE	843
11		
12	BY MR. SOBOL	845
13		
14	CERTIFICATE	847
15		
16	ERRATA	849
17		
18	ACKNOWLEDGMENT OF DEPONENT	850
19		
20	LAWYER'S NOTES	851
21		
22		
23		
24		
25		

1	DEPOSITION EXHIBITS		
2	MEREDITH B. ROSENTHAL,		
3	Ph.D.		
4	May 5, 2019		
5	NUMBER	DESCRIPTION	PAGE
6	Rosenthal-22	Data Appendix	553
7	Rosenthal-23	Case and Deaton	599
8	Rosenthal-24	Publication	650
9		CDC Guideline for	
10		Prescribing Opioids for	
11		Chronic Pain, United	
12		States, 2016	
13	Rosenthal-25	2017 Haider et al	689
14		Publication	
15	Rosenthal-26	AAEM White Paper on	703
16		Acute Pain Management in	
17		the Emergency Department	
18	Rosenthal-27	MD Anderson Cancer	710
19		Center Postoperative	
20		Pain Management	
21		Guidelines	
22	Rosenthal-28	Kadian Instructions for	726
23		Use	
24	Rosenthal-29	Joint Statement,	809
25		Promoting Pain Relief	
		and Preventing Abuse of	
		Pain Medications: A	
		Critical Balancing Act	
	Rosenthal-30	State of Ohio House Bill	825
		No. 187	
	Rosenthal-31	Ohio Prescription Drug	834
		Abuse Task Force Final	
		Report	

1 PROCEEDINGS

2 (May 5, 2019 at 8:04 a.m.)

3 THE VIDEOGRAPHER: We're now on
4 record. My name is Vince Rosica. I'm
5 a videographer for Golkow Litigation
6 Services. Today's date is May 5th,
7 2019, and the time is 8:04 a.m.

8 This video deposition is being
9 held in Boston, Massachusetts in the
10 matter of National Prescription Opiate
11 Litigation, MDL No. 2804 for the
12 Northern District of Ohio, Eastern
13 Division Court.

14 The deponent is Meredith
15 Rosenthal.

16 Counsel will be noted on the
17 stenographic report.

18 The court reporter is Mike
19 Miller and will now swear in the
20 witness.

21 (Witness sworn.)

22 MR. SOBOL: Before you begin, I
23 think the professor had one quick
24 update.

25 THE WITNESS: Yes. Remember

1 yesterday you were asking me about if
2 I had testified in other litigation
3 related to opioids, and I knew that I
4 had been retained in a case, and I
5 could not remember whether I had
6 actually testified. So I looked that
7 up, and indeed, sometime around five
8 years ago, not recently enough to
9 appear in the case captions that I
10 list at the back of my CV, I testified
11 in a matter related to Actiq, the
12 Cephalon drug.

13 MR. ROTH: You anticipated my
14 very first question.

15 THE WITNESS: Excellent.

16 MEREDITH B. ROSENTHAL, Ph.D.,
17 having been previously duly sworn,
18 testified as follows:

19 BY MR. ROTH:

20 Q. What was the nature of your
21 expert opinion in that case?

22 A. I did a damages analysis for
23 class certification proceedings.

24 Q. And was it limited to a single
25 manufacturer?

1 A. Yes, it was a single drug,
2 single manufacturer. I can't recall the
3 details. I didn't go all the way back to the
4 complaint, but it was an off-label marketing
5 case.

6 Q. And do you recall whether you
7 used a regression analysis in that case?

8 A. I did not.

9 Q. Okay. May have more questions,
10 but that's good for now.

11 Professor Rosenthal, you
12 mentioned a couple of times yesterday that
13 you excluded injectables from your analysis?

14 A. Yes, that's right.

15 Q. Why did you do that?

16 A. That was in consultation with
17 counsel. So I understood they were not to be
18 considered in the matter, and I understand
19 from clinical experts that the uses of the
20 injectables are somewhat different than the
21 orals.

22 Q. Do you know anything about
23 whether the marketing for injectables differs
24 from the marketing for the oral opioids?

25 A. I do not.

1 Q. Your model does not attribute
2 any causality to manufacturers based on
3 alleged deficiencies in the suspicious order
4 monitoring regime?

5 A. My assignment was to examine
6 the impact of the allegations with regard to
7 marketing, and so I have not specifically
8 looked at the impact of any
9 monitoring-related allegations.

10 Q. And that would be true also for
11 the distributors and the pharmacies; because
12 your allegations relate to marketing, you
13 have not included them in any of your
14 analyses in your reports?

15 MR. SOBOL: Objection.

16 A. Again, my assignment was to
17 examine the impact of the alleged unlawful
18 marketing. I have not considered other
19 conduct in my analysis.

20 BY MR. ROTH:

21 Q. We spoke yesterday about
22 endogeneity, and I think I marked as
23 Exhibit 14 an article you wrote for the
24 Kaiser Family Foundation, if you could pull
25 that up, please.

1 A. Let me see if Mike organized my
2 documents. Yes. Go ahead.

3 Q. You testified yesterday that
4 endogeneity did not need to be controlled for
5 in your model because it's an aggregate
6 model.

7 A. Yes.

8 Q. Are you aware of any economic
9 literature that does control for endogeneity
10 in an aggregate model measuring the impact of
11 promotion on sales?

12 A. An industrywide aggregate model
13 like mine, I'm not aware of one.

14 Q. And is there a difference in
15 your mind between industrywide versus
16 classwide?

17 A. Yes, there is. Again, if the
18 notion is that whatever causes the
19 endogeneity has to be either some kind of
20 simultaneous decision-making around price and
21 quantity, for example, or a feedback loop,
22 and at the level of the industry, that's
23 simply not plausible, that the industry is
24 coordinating its marketing in that way.

25 Q. Your model in this case though

1 is not actually an industrywide model, is it?

2 A. Again, industrywide for the
3 opioid industry?

4 Q. Well, except you take out all
5 of the non-defendants from your model?

6 A. Well, that's not true. The
7 model is all of the -- all of the opioids.
8 The but-for scenario takes -- leaves the
9 non-defendants as they were, but the model
10 concludes all of them.

11 Q. Right. So in the but-for
12 scenario where you take out the
13 non-defendants, what did you do to compare
14 their promotional activities to the
15 defendants' promotional activities?

16 MR. SOBOL: Objection.

17 A. Well, such a comparison is not
18 part of the overall analysis. Again, we've
19 talked about the Table C, which presents the
20 marketing by defendants and non-defendants,
21 so the data are in there.

22 The model itself includes
23 marketing for all opioids, and the but-for
24 scenario simply disaggregates and identifies
25 as a part of that process the marketing of

1 non-defendants, but it does so only to
2 generate different predictions of what sales
3 would have been, so there -- I did not make a
4 statistical comparison between non-defendant
5 and defendant promotion.

6 BY MR. ROTH:

7 Q. When you removed the
8 non-defendants, what did you do to confirm
9 that that did not take out, for example, the
10 non-rivalrous marketing and leave you with a
11 set of just the rivalrous marketing?

12 MR. SOBOL: Objection.

13 A. What I'm examining in my
14 aggregate model is the net effect, rivalrous
15 market expanding of promotion, and so the
16 model calculates that average market
17 expansion effect and essentially all of the
18 rivalrous marketing, it nets out by
19 definition because to the extent that we're
20 talking about rivalrous marketing as defined
21 as moving market shares from one drug to the
22 other, which is basically the definition of
23 rivalrous marketing, all the pluses have to
24 net out with the minuses.

25 And so that -- that does not

1 appear in the output of my model because it's
2 not relevant to my assignment. So by taking
3 out all of the -- actually, technically, it's
4 sort of a double negative. I actually leave
5 in all of the non-defendant promotion in the
6 but-for scenario because it would have
7 happened regardless of whether the
8 allegations are true or not.

9 By leaving that in, if it has
10 rivalrous components to it, if it has market
11 expanding components to it, whatever that is
12 will show up in my predictions.

13 BY MR. ROTH:

14 Q. Yeah. What I'm trying to
15 understand is I think we agree that when you
16 look at an individual manufacturer there
17 could be endogeneity issues in the form of
18 price or in the form of detailing physicians
19 who are predisposed to prescribe their
20 product?

21 A. If we were looking at an
22 individual manufacturer, we could have some
23 of those endogeneity concerns, but I do not
24 look at an individual manufacturer.

25 Q. I understand that.

1 Even if we look at a group of
2 manufacturers, we would still have
3 endogeneity concerns to a degree?

4 MR. SOBOL: Objection. Excuse
5 me. Asked and answered.

6 A. It's my opinion that in this --
7 when we're looking at the level of the entire
8 opioid industry, that the conceptual basis
9 for such endogeneity concerns is really not
10 there, and even -- even if at the second
11 stage of my analysis I parse out some subset
12 of defendant, of manufacturers, sorry,
13 non-defendants, in particular, that in and of
14 itself doesn't raise a new endogeneity
15 concern. The model is estimated on the
16 marketwide effects.

17 BY MR. ROTH:

18 Q. I'm trying to figure out where
19 the line is though. So like how many
20 manufacturers need to be included for all of
21 the endogeneity and rivalrous marketing
22 issues to just net out and show market
23 expansion as opposed to the effects of just
24 the subset you're looking at?

25 MR. SOBOL: Objection to the

1 form.

2 You can answer.

3 A. The rivalrous marketing will
4 always net out. Again, it's just
5 mathematically true that by definition,
6 marketing that only moves market share, it
7 has to net out. So that's just an identity.

8 That will always be true when
9 we look at any subgroup of products that
10 we -- that the rivalrous piece will net out.
11 It just has to.

12 BY MR. ROTH:

13 Q. What about endogeneity?

14 A. The endogeneity issue in my
15 opinion is where we have the entire opioid
16 class in the analysis. It does not make
17 sense to think about this month-to-month
18 reverse causality for marketing as a whole
19 for the industry, relative to sales as a
20 whole for the industry. It's not how
21 individual companies set their marketing
22 budgets.

23 It just doesn't make economic
24 sense to me, so for the analysis at hand,
25 looking at the entire opioid industry, I do

1 not believe that there's a conceptual basis
2 for the same endogeneity concerns that we
3 might have with an individual drug or an
4 individual company.

5 Q. Your analysis compares your
6 industrywide but-for scenario against a
7 scenario with just the defendant
8 manufacturers, correct?

9 MR. SOBOL: Objection.

10 A. So my analysis ultimately
11 compares the predicted -- the actual
12 predicted sales, so that's leaving everything
13 the same with a world in which we pull out
14 some subset of the marketing.

15 BY MR. ROTH:

16 Q. So what I'm trying to
17 understand is I understand your position on
18 the big but-for scenario with the whole
19 industry, but why is endogeneity not a
20 concern for the pulled-out set of
21 manufacturers?

22 MR. SOBOL: Objection.

23 A. There's no estimation that's
24 going on there, so endogeneity is a concern
25 when we're estimating parameters using a

1 regression model. It is not -- the second
2 stage of my analysis is simply employing
3 those parameters to predict a different
4 scenario, and so endogeneity, it's -- it's
5 not a relevant construct for that prediction
6 piece.

7 BY MR. ROTH:

8 Q. If you look at Exhibit 14, this
9 was the article you prepared for the Kaiser
10 Family Foundation in 2003, and if you look at
11 page 2, the last paragraph on the page, you
12 say: In this paper, we examine the effects
13 of two types of promotional spending for
14 brands in five therapeutic classes of drugs,
15 using monthly aggregate data from August 1996
16 through December 1999.

17 Do you see that?

18 A. I do.

19 Q. So you actually looked at five
20 different classes of drugs. Do you recall
21 what drugs they were?

22 A. Antidepressants, nasal sprays,
23 non-sedating antihistamines, PPI's, which are
24 proton pump inhibitors, and number 5, let me
25 just look at -- there are some tables that

1 are probably the easiest place. I'm blanking
2 on the fifth one. Cholesterol,
3 anticholesterol drugs.

4 Q. Turn to page 14, please.

5 A. Okay.

6 Q. And on page 14 you say: We
7 take account of the possibility that spending
8 on direct-to-consumer advertising and
9 physician promotion and product sales are
10 jointly determined by estimating instrumental
11 variables, IV, models where all three
12 variables are assumed to be endogenous.

13 Do you see that?

14 A. Yes.

15 Q. And I think you said yesterday
16 this article only solved for endogeneity at
17 the product level?

18 A. I believe so, yes.

19 Q. Okay. And if you look at the
20 bottom of page 9, in the last paragraph it
21 says: At the top level of the tree, which
22 represents the therapeutic class of drugs, we
23 estimate the impact of DTCA spending and
24 detailing in the context of a Cobb-Douglas
25 demand specification, double logarithmic. In

1 the analysis of competition at the individual
2 product level within each class we specify
3 and estimate three alternative models: 1, an
4 AIDS-type specification; 2, a logit model
5 with log of quantity share divided by, one
6 minus quantity share, on the left-hand side,
7 and prices and promotional spending on the
8 right-hand side; and 3, a Cobb-Douglas model
9 in log levels.

10 Do you see that?

11 A. Yes, I do.

12 Q. And then on page 15, under
13 Econometric Results, it says: We begin by
14 presenting results in Table 3 for the top of
15 the tree structure in Figure 2, the class
16 level quantity equations.

17 Do you see that?

18 A. I do.

19 Q. And then if you look at
20 Table 3, which is on page 25, the top two
21 lines say: Class DTC and Class Detail, and
22 they have an asterisk that says Endogenous,
23 IV Estimated.

24 Do you see that?

25 A. Yes, I do. Actually, I can

1 keep reading, but I think essentially the
2 class level estimates are the sum of the
3 individual product level estimates. So
4 again, the instrumentation was at a product
5 level.

6 Q. And then applied to the class
7 level through aggregation?

8 A. That's right.

9 Q. Okay. And if you had
10 disaggregated individual drugs or
11 manufacturers in this case, you could have
12 applied an instrumental variables method to
13 each and aggregated them similarly here?

14 MR. SOBOL: This case, the
15 opioids case, not this?

16 MR. ROTH: Correct, so let me
17 reask it.

18 MR. SOBOL: Yeah.

19 BY MR. ROTH:

20 Q. If you had used disaggregated
21 individual drugs or manufacturers in the
22 opioids case we're talking about now, you
23 could have applied an instrumental variables
24 model to each individual drug and then
25 aggregated them as you did in this article?

1 A. Unlike the research question in
2 this paper, my assignment asks me to compute
3 the impact of the alleged misconduct at the
4 level of the class, the industry, opioid
5 industry as a whole. And so it was not
6 appropriate for me to look at individual drug
7 level analyses.

8 I maintain that at that class
9 level, industry level, these endogeneity
10 questions do not pertain.

11 Q. Did you test that hypothesis by
12 looking at an individual defendant or two to
13 see how the issues there compare to how your
14 model handles endogeneity?

15 A. Since my assignment was an
16 aggregate assignment, I have conducted my
17 analysis at the aggregate level. I have not
18 conducted my analysis at the level of an
19 individual defendant.

20 Q. And, in fact, to confirm,
21 you've not reviewed any individual
22 defendant's marketing materials for any drug
23 at issue in this case?

24 MR. SOBOL: Objection, asked
25 and answered.

1 A. I'm not sure what you mean by
2 that exactly. I reviewed the documents that
3 you see I relied on in my report. I would
4 consider those to be marketing materials.

5 BY MR. ROTH:

6 Q. You've not reviewed any
7 manufacturer's marketing plan for any drug at
8 issue in this case?

9 MR. SOBOL: Objection.

10 A. Again, I'm not sure that that's
11 entirely correct. I do cite to what I would
12 consider to be marketing plans.

13 BY MR. ROTH:

14 Q. Okay. Aside from the documents
15 reflected in Attachment B or cited in your
16 report, you've not reviewed any marketing
17 materials for any drugs at issue in this
18 case?

19 A. Aside from materials cited in
20 my report, I've certainly not relied on any
21 of those marketing materials.

22 Q. And aside from the depositions
23 reflected in Attachment B, you've not
24 reviewed any depositions from any
25 manufacturer's sales representatives?

1 A. Aside from the depositions that
2 I cite in my report, I'm not relying on any
3 other deposition testimony, no.

4 Q. You've not reviewed any
5 testimony or other direct evidence from
6 doctors about how they were affected by a
7 given manufacturer's promotion?

8 MR. SOBOL: Objection.

9 A. As I note in my report, as an
10 economist, asked to examine the impact of the
11 alleged marketing misconduct, interviewing
12 physicians would not be a scientifically
13 appropriate methodology to ascertain impact.

14 We know that self-report is
15 unreliable, particularly when it comes to
16 behavior that may be socially unacceptable.

17 BY MR. ROTH:

18 Q. So if doctors from Summit or
19 Cuyahoga County testified at trial that they
20 were detailed but it didn't affect them, as
21 an economist, you would dismiss that
22 testimony?

23 MR. SOBOL: Objection.

24 A. As an economist, I would rely
25 on the evidence about what people do and not

1 what people say. It's been demonstrated in
2 the literature, literature that I cite in my
3 report, that again, that self-report is not a
4 reliable basis for ascertaining impact, so I
5 would not rely on physician self-report.

6 BY MR. ROTH:

7 Q. If defendants presented
8 testimony from 15 doctors at trial who all
9 said their prescribing practices were
10 unaffected by opioids promotion, would your
11 position be different?

12 A. I do not believe that numeracy
13 overcomes bias. There's no scientific basis
14 for such a conclusion, so no, I do not
15 believe that physician self-report is
16 reliable, even if there are 15 physicians.

17 Q. So in your view as an
18 economist, the testimony of any number of
19 doctors regarding how they viewed the effect
20 of defendants' promotion has no relevance?

21 A. I would not draw any conclusion
22 from such testimony for the purposes that my
23 report has been set forth.

24 Q. You did not review any
25 manufacturer's disaggregated marketing data

1 for the purpose of your analysis?

2 MR. SOBOL: Objection, form.

3 A. Again, in my report I cite
4 certain documents that have data in them
5 related to marketing. I do not use those
6 data in my calculations.

7 BY MR. ROTH:

8 Q. And I think you said yesterday,
9 you made a very specific request to look for
10 such data. Do you remember that?

11 A. I did, yes.

12 Q. And why did you ask for that?

13 A. When I started my work, I
14 wanted to know about what all the possible
15 data sources that would be available were.

16 Q. And if you had a more robust
17 source of disaggregated marketing data across
18 defendants, would you have used that to model
19 promotion instead of the IQVIA data that you
20 used?

21 MR. SOBOL: Objection.

22 A. I can't say for sure, but I
23 wanted to find all the data that I could
24 from -- from discovery.

25 ///

1 BY MR. ROTH:

2 Q. You did not review any
3 manufacturer's detailing call notes?

4 A. I did not review any detailing
5 call notes, no.

6 Q. And I think you said this
7 yesterday, but just to confirm, you did not
8 comprehensively review all of any given
9 manufacturer's marketing budgets for a
10 specific drug in this case?

11 MR. SOBOL: Objection, asked
12 and answered.

13 A. I did not systematically review
14 those marketing budgets, no.

15 BY MR. ROTH:

16 Q. And so when you calculate the
17 percentages in Table 3 of your report, as we
18 discussed, that's just a comparison of
19 removing each defendant's promotional
20 contacts in the data from the aggregate
21 model?

22 MR. SOBOL: Objection, asked
23 and answered.

24 A. Table 3 presents alternative
25 simulations of but-for scenarios in effect,

1 in which individual defendants are -- their
2 marketing efforts are deemed to be not
3 subject to recovery of any kind, and so that
4 those marketing efforts are left in the
5 but-for scenario.

6 So it is a -- it's a product of
7 the regression -- my direct regression model.

8 BY MR. ROTH:

9 Q. I want to work with you on a
10 hypothetical. So let's assume that no opioid
11 marketing occurred beginning in 1993.

12 A. No opiate -- opioid marketing
13 at all?

14 Q. Correct, no promotion, no IQVIA
15 contacts.

16 A. Okay.

17 Q. So in your model --

18 MR. SOBOL: I'm sorry, just so
19 it's clear, do you mean that or the
20 broader --

21 MR. ROTH: Well, let's start
22 with -- that's fair.

23 MR. SOBOL: You know what I
24 mean?

25 MR. ROTH: That's fair.

1 BY MR. ROTH:

2 Q. So let's start with no
3 promotion at all, no marketing, no detailing,
4 no articles, nothing, a world without
5 promotion, okay?

6 A. Okay.

7 MR. SOBOL: Sounds wonderful.

8 BY MR. ROTH:

9 Q. All right. So if promotion
10 hadn't occurred since 1993, the only thing
11 your model would use would be price and the
12 constant terms.

13 MR. SOBOL: Objection.

14 But you can answer.

15 BY MR. ROTH:

16 Q. Correct?

17 A. You're sort of suggesting that
18 the underlying data would be totally
19 different, but yes, the -- if the stock of
20 promotion is always zero, then it wouldn't
21 enter into the estimation, so it would be
22 price and the constant term, yes.

23 Q. What does your model say the
24 level of sales would be if the stock of
25 promotion is always set to zero?

1 A. Well, again, you're
2 constructing a hypothetical that's outside of
3 the world in which I'm actually putting this
4 model together, but it would depend on the
5 level of sales.

6 Essentially, as you can see in
7 my indirect model, price would cause a small
8 decline in sales over the time period.

9 Q. So would it show any sales?

10 A. Well, your hypothetical is --
11 you didn't tell me what the baseline level of
12 sales was.

13 Q. Okay. So assume a small
14 baseline level of sales. It would start
15 there and decline over time? Is that what
16 you're saying?

17 A. Yes.

18 Q. Okay. So -- and the reason for
19 that is because all of the sales in your
20 model are explained by marketing as
21 counterbalanced by price?

22 A. Well, again, you have to take
23 into account the specifics of the
24 specification I used. So the sales are
25 explained by marketing in combination with

1 the depreciation rate in combination with the
2 specific functional form I use.

3 Your hypothetical is not one
4 that makes any sense to me as a health
5 economist, and it's generally good practice
6 in applied economic analysis to not
7 extrapolate too far outside of the world
8 you're analyzing. So we don't want to
9 forecast 50 years out from this model.

10 Likewise, to apply it to a
11 world in which there's no marketing when that
12 is so different from the world that we're in,
13 is -- it's a stretch that doesn't make a lot
14 of sense to me as a hypothetical.

15 Q. But in order to test whether
16 your model allows for anything but marketing
17 to cause sales, does it not make sense to set
18 marketing at zero?

19 A. It does not make sense to me to
20 set marketing at zero. That's not something
21 I would do in a model like this.

22 Q. All right. If we do set
23 marketing to zero, however, it shows that no
24 other factors are driving an increase in
25 sales in your model?

1 A. In the model, if -- if
2 promotion were at zero, Model C might look
3 different. In fact, promotion is the
4 dominant factor driving sales, so what you're
5 asking is a hypothetical that essentially
6 assumes away what we know the fundamental
7 sales driver is in this industry, and so it's
8 a nonsensical hypothetical to me.

9 Q. And when you say you know the
10 fundamental sales driver for opioids is
11 marketing, how do you know that?

12 A. Look at Dr. Perri's report.
13 Look at any of the articles that we've talked
14 about. Promotion is critically important in
15 the pharmaceutical industry.

16 Q. That's an assumption you're
17 making based on Dr. Perri, not something that
18 you've studied specifically in the opioid
19 industry before, correct?

20 MR. SOBOL: Objection.

21 Objection, asked and answered.

22 A. That's -- it's based on
23 economic theory. It's based on economic and
24 marketing analysis. It's not an assumption
25 that I'm just taking from Dr. Perri.

1 BY MR. ROTH:

2 Q. So in your view, a model that
3 allows for nothing but promotion to predict
4 positive sales is reasonable because you
5 believe promotion is what drives marketing
6 for opioids?

7 MR. SOBOL: Objection.

8 MR. ROTH: Sorry, that was a
9 bad question. Let me rephrase it.

10 BY MR. ROTH:

11 Q. In your view, a model that
12 allows for nothing but promotion to predict
13 positive sales is reasonable because you
14 believe promotion is what drives sales for
15 opioids?

16 MR. SOBOL: Objection.

17 A. I think there are many issues I
18 would have with that statement. So, first of
19 all, my model is looking at the extent to
20 which promotion is driving increases in
21 sales.

22 As we talked about at length
23 yesterday, there may be things that affect
24 whether a particular patient or a particular
25 physician uses a specific medicine. What I'm

1 trying to explain is growth over time, so
2 that's not the same as what might explain
3 levels.

4 Second, I would say that the
5 model demonstrates that promotion causes
6 sales. It is not an inherent assumption.
7 The basic structure of my model is the same
8 as the models in the published papers that we
9 looked at that use aggregate time series data
10 because in time series, we're looking at the
11 factors that drive changes over time, and
12 prices and promotion are those factors.

13 BY MR. ROTH:

14 Q. In your view, your model proves
15 the hypothesis that promotion of opioids
16 drives increased sales of opioids?

17 A. Yes, that is the conclusion I
18 reach in my report.

19 Q. And before you put your
20 regression model together, you believed that
21 promotion of opioids drove sales of opioids?

22 A. As a health economist and as
23 someone who's done work in this area before,
24 my priors were that promotion is an important
25 factor in causing sales increases, yes.

1 Q. And, in fact, nothing aside
2 from promotion in your model would allow for
3 an increase in the sales of opioids?

4 MR. SOBOL: Objection.

5 A. In setting up the model, before
6 doing the analysis, while I expected prices
7 to have the relationship with sales that they
8 did, I did not know whether the prices, as we
9 discussed yesterday, would be rising or
10 falling.

11 So as a matter of specifying
12 the model, the effect of prices could have
13 been either to accelerate or decelerate
14 growth.

15 BY MR. ROTH:

16 Q. That was a good answer, but I
17 don't think it directly responded to my
18 question.

19 In your model --

20 MR. SOBOL: That's a
21 contradiction.

22 BY MR. ROTH:

23 Q. In your model, there is nothing
24 aside from increased promotion that causes an
25 increase in the sale of opioids?

1 MR. SOBOL: Objection, asked
2 and answered.

3 A. Again, in the model as
4 specified, prices could have had either a
5 positive or negative effect, not because the
6 coefficient could have been positive or
7 negative, but because the trend could have
8 been positive or negative.

9 In practice, when I estimated
10 the model, the underlying data suggested that
11 prices were, in fact, increasing, and thus
12 decreasing sales, and so promotion is the
13 single variable in Model B that is causing
14 increases in sales.

15 In Model C, as we talked about
16 yesterday, one of the dummy variables appears
17 positive in a way that is counterintuitive;
18 nonetheless, it accounts for some of that
19 sales growth.

20 BY MR. ROTH:

21 Q. You included no other variables
22 in your direct regression model beyond price
23 and promotion; is that right?

24 A. In Model B, I include price,
25 promotion, the constant, and I estimate the

1 depreciation rate.

2 In Model C, I include those
3 five event dummies.

4 Q. What did you do to measure the
5 impact of non-defendant promotion on market
6 expansion?

7 MR. SOBOL: Objection, asked
8 and answered.

9 A. My model is an aggregate model
10 and the estimation includes defendants and
11 non-defendants, and so the coefficient
12 estimated on promotion in the model pertains
13 to the impact of both defendants and
14 non-defendants.

15 BY MR. ROTH:

16 Q. Your but-for world in your
17 model excludes defendant promotion?

18 A. The but-for scenario excludes
19 defendant promotion, yes.

20 Q. What is the result if the
21 but-for world excludes all promotion and
22 keeps all else equal?

23 A. I have not been asked to look
24 at a but-for scenario. As we were talking
25 before about the idea of zero promotion,

1 that's not a scenario I've looked at.

2 Q. You spoke a minute ago about
3 Model C. I want to come back to that for a
4 minute.

5 If you turn to Table 1.

6 A. 47.

7 Q. Thank you.

8 A. Mine is getting well leafed.

9 Q. And actually, that's not the
10 one I want. I'm sorry. I went the wrong
11 way. I actually want Attachment D, the table
12 that shows your coefficients for Model C.

13 A. Okay.

14 Q. So I think it's D.8.

15 A. No.

16 Q. No, D.8. Table D.8.

17 A. Oh, Table D.8, sorry.

18 Q. Yeah. You numbered the tables
19 the same way as the pages. It makes it
20 confusing.

21 A. Very confusing, okay.

22 Q. So in Table D.8, the stock of
23 promotion with the trend for the period
24 starting in August 10 is negative; is that
25 right?

1 A. That's right.

2 Q. And you maintain the negative
3 depreciation rate, which means sort of
4 growing stock of promotion even in that
5 period?

6 A. Right.

7 Q. And we spoke about that a
8 little bit yesterday, but can you just
9 explain for me why it is that the
10 effectiveness of promotion as a whole is
11 declining but the stock of promotion
12 continues to grow in the third period of your
13 model?

14 MR. SOBOL: Asked and answered.
15 You can answer.

16 A. Yes. The depreciation rate, I
17 estimate a single depreciation rate over the
18 entire time period, and it's my belief that
19 the negative depreciation rate reflects the
20 addictive nature of opioids.

21 That does not change in the
22 latter part of the period, so despite the
23 fact that the marginal productivity of
24 promotion is declining over that period, the
25 idea that the stock of promotion continues to

1 grow is not conceptually inconsistent.

2 BY MR. ROTH:

3 Q. We agree that all detailing is
4 not equally effective?

5 MR. SOBOL: Objection.

6 A. I -- here I am trying to
7 estimate -- I am estimating the average
8 effect of detailing. There may be some
9 variation in that effect, but I'm interested
10 in the aggregate impact.

11 And so the fact that my
12 analysis averages across some -- some
13 variation is not mathematically a problem.
14 It will still lead me to the right answer in
15 terms of the aggregate impact.

16 BY MR. ROTH:

17 Q. I assume you agree based on the
18 way you've constructed Model B that the
19 effectiveness of detailing changes over time?

20 A. That is what Model B captures.

21 Q. Right. Detailing that may have
22 been effective earlier in time may become
23 less effective over time as new information
24 comes to light?

25 A. Well, I think the premise

1 you're suggesting there is, again, it ignores
2 the addictive nature of the product, so once
3 a patient is using opioids and has increasing
4 needs for higher doses; whether or not the
5 specific messages are still in the mind of
6 their physician, they are nonetheless
7 addicted to the product or tolerant of the
8 product and requiring higher and higher doses
9 which will show up in my data as higher and
10 higher MMEs.

11 So I can't quite agree with the
12 premise and its relevance to the analysis.

13 Q. Based on your last answer, I
14 assume you'd agree that when a patient
15 receives higher doses of opioids, that may be
16 a sign of tolerance as opposed to addiction?

17 A. Yes, higher doses may be
18 tolerance and not necessarily addiction.
19 Again, I'm not a clinical expert, so I want
20 to be careful not to go too far with that.

21 Q. In fact, a patient who is being
22 successfully treated with opioids for chronic
23 pain may become tolerant and need a higher
24 dose to achieve the same pain deterrent
25 effect?

1 A. I think we're getting a little
2 too far out of my expertise and into clinical
3 questions.

4 Q. Do you believe that promotion
5 has a greater impact on the very first
6 prescription a physician writes for a therapy
7 like opioids or for subsequent prescriptions
8 the physician may write for the same drug?

9 MR. SOBOL: Objection.

10 A. I'm not sure it makes
11 conceptual sense to distinguish that. I
12 think that there is a -- there is an inherent
13 connection that happens when someone starts
14 on a medicine. They have a higher
15 probability of being on that medicine next
16 month than someone who didn't start, right,
17 so that -- that would be a natural underlying
18 connection between the two things.

19 It may be that promotion also
20 has a reminder effect, and so that would be
21 an increment in addition to the fact of that
22 patients once on a drug may be likely to stay
23 on a drug.

24 I have not tried to distinguish
25 those factors.

1 BY MR. ROTH:

2 Q. Is that an issue that you have
3 studied or seen economic literature on,
4 whether promotion is more effective at
5 getting doctors to initiate a therapy versus
6 maintain a therapy they've already used in
7 the past?

8 A. Again, for the purposes of my
9 analysis, I had no need or wish to
10 distinguish between those things. I can't
11 point to a paper right now, but I believe
12 that maybe someone has done that.

13 Q. I assume you're aware there are
14 different classes of opioids, correct?

15 A. There are different molecules,
16 like oxycodone and hydrocodone, is that what
17 you're referring to when you say classes?

18 Q. Well, there are different
19 molecules, that's one thing.

20 A. Yes.

21 Q. There are different
22 formulations, right?

23 A. Yes.

24 Q. There are different methods of
25 administration?

1 A. Yes.

2 Q. There's a patch, right?

3 A. Yes.

4 Q. There's that sublingual spray?

5 A. Yes.

6 Q. And then there's pills and
7 injectables, for example?

8 A. Yes.

9 MR. SOBOL: Film.

10 BY MR. ROTH:

11 Q. Film?

12 A. Yes, I'm aware that there are
13 different formulations.

14 Q. And there's also
15 immediate-release opioids and
16 extended-release opioids, correct?

17 A. Yes, that's correct.

18 Q. And for the purpose of your
19 models, apart from the injectables, all of
20 those various forms of opioids are included?

21 A. Yes, that's correct.

22 Q. Did the manufacturers'
23 marketing budgets that you reviewed show
24 increased marketing spending over time?

25 A. As I sit here, I don't recall.

1 Q. Would you agree that if the
2 depreciation rate augments the stock of
3 detailing over time, it would be irrational
4 to keep spending money on promotion?

5 MR. SOBOL: Objection.

6 A. No, I don't think that that
7 would be a conclusion that I would agree
8 with.

9 BY MR. ROTH:

10 Q. And why not?

11 A. The more effective your
12 marketing is, the more you want to spend on
13 it.

14 MR. SOBOL: An answer I
15 understood.

16 BY MR. ROTH:

17 Q. We spoke briefly about your
18 errata yesterday. Can you just tell me how
19 did that errata come about?

20 A. That came about from review
21 partly, my very careful review as I was
22 preparing for this deposition, and the staff
23 doing the same.

24 Q. Got it.

25 And then why did it come in the

1 form of a memo from Mr. McCluer to you and
2 Mr. Sobol?

3 A. I'm not sure I can answer that
4 question.

5 Q. But it sounds like the errors
6 were identified some by you and some by the
7 staff?

8 A. Yes, that's correct.

9 Q. Do you know who caught the
10 Table 3 error?

11 A. That was me.

12 Q. I feel bad for the staff on
13 that one. And what about the --

14 A. I'm not the yelling type.

15 Q. And what about the statistical
16 significance error, was that you or the
17 staff?

18 A. That was the staff.

19 Q. Let's turn to your indirect
20 model.

21 A. Okay.

22 Q. So you talk about your indirect
23 model beginning at paragraph 78 of your
24 report.

25 And I guess just taking a step

1 back before we get into specifics: Do you
2 have a preference for your direct over your
3 indirect model in this case?

4 A. I believe they have strengths.
5 Each of them has strengths, so in my
6 opinions, I have not favored one over the
7 other.

8 Q. In general when you perform
9 regression analysis, do you have any
10 preference for a direct approach versus an
11 indirect approach?

12 A. No preference. I think these
13 kinds of models are really context specific.

14 Q. And if you look at page 53,
15 paragraph 78, you start by saying: As noted
16 earlier, the direct method of estimation is
17 limited in part by the extent to which we can
18 measure and include in the models all of the
19 tactics allegedly employed by defendants,
20 including manipulation of various
21 professional societies and accrediting
22 bodies.

23 Did I read that correctly?

24 A. Yes, you did.

25 Q. And that's based on the

1 allegations that you reviewed?

2 A. That's correct.

3 Q. Would you agree that if a
4 defendant did not engage in promotion other
5 than the detailing measured by the IPS data,
6 the direct model would be a more appropriate
7 measure of that particular defendant's impact
8 on the aggregate MMEs?

9 A. My assignment was to calculate
10 aggregate impact, so I have not considered
11 how to calculate impact for a single
12 defendant.

13 As we talked about yesterday, I
14 think there are some complicated questions
15 about how to deal with the spillover effect,
16 so I have not undertaken to do that.

17 Q. As we've discussed fairly
18 exhaustively, your direct Model B explains
19 over 99% of the variation in MME sales based
20 on the detailing data in IQVIA.

21 A. Yes, it does.

22 Q. Does that not suggest that the
23 effect of all of these other types of
24 promotion is negligible at best?

25 A. It may well be the case that

1 the amount of variation that is picked up by
2 a broader measure of promotion would not be
3 so much more. The indirect model is
4 conceptually quite different, however.

5 Q. So if you compare Table 5,
6 which is on page 61 -- let's take a step
7 back, lay some foundation.

8 A. Sure.

9 Q. So Table 5 on page 61 is the
10 output of your indirect model, correct?

11 A. It is.

12 Q. Okay. We talked yesterday
13 about Table 2, which is the output of your
14 direct model and appears on page --

15 A. Should I bend the corner so we
16 can go back and forth?

17 Q. Yes, good idea.

18 So I want to compare the direct
19 output in Table 5 on page 61 -- sorry, strike
20 that.

21 I want to compare the indirect
22 model output in Table 5 on page 61 with the
23 direct model output in Table 2 on page 51.

24 A. Okay.

25 MR. SOBOL: Do we have a graph

1 of this somewhere?

2 THE WITNESS: Not in my report.

3 MR. ROTH: Just for you. I
4 don't think we've seen that. I would
5 love to see it.

6 BY MR. ROTH:

7 Q. So looking at the two tables
8 next to each other, I guess just first taking
9 the bottom line, in Table 2, the direct Model
10 B estimates that [REDACTED] of MMEs are
11 attributable to defendants' detailing.

12 Do you see that?

13 A. Yes.

14 Q. And in Table 5, the indirect
15 method suggests that [REDACTED] of MME shipments are
16 attributable to defendants' detailing; is
17 that right?

18 A. That's correct.

19 Q. So that's a [REDACTED] delta -- well,
20 that's a bad question because that's not how
21 math works.

22 MR. SOBOL: Right.

23 BY MR. ROTH:

24 Q. It's [REDACTED] higher -- well, the
25 numbers are what they are, but it's [REDACTED]

1 and ■■■ -- it's actually ■■■ higher, I think,
2 if I'm doing the math right.

3 A. It is ■■■ percentage points or
4 about ■■■ higher than the direct estimate.

5 Q. You said it better than I
6 could.

7 How is that possible given that
8 you had a 99% R-squared in the direct model
9 that your indirect model could estimate twice
10 as much impact by defendants' promotion?

11 A. As I mentioned, they are
12 conceptually very different kinds of
13 analyses, so whether or not detailing
14 explains the vast majority of the variation
15 in sales, it does not account for -- it
16 accounts for a smaller percentage of total
17 sales, so the magnitude of effect is not the
18 same thing as the amount of variation
19 explained, right?

20 And the indirect model takes
21 the position that there are these long run
22 factors that may -- that we can see are
23 relevant to demand in -- across areas, and if
24 we extend those forward, looking at the
25 growth in MMEs only as a result of those

1 factors, that's another version of what the
2 world would have been like.

3 It assumes, again, that the
4 drivers of the massive growth we saw were
5 only related to defendant promotion, and so
6 it allows defendant promotion to affect sales
7 in a broader way than the direct model does.

8 Q. In the direct model, I believe
9 you went through 2018; is that right?

10 A. Yes. There were differences in
11 data availability, so yes.

12 Q. Right. So that was what I was
13 going to ask you.

14 Direct goes through 2018,
15 indirect only goes through 2016?

16 A. Yes. And as I'm sure we'll get
17 to also, because the ARCOS data start in
18 1997, I do, I backcast for '95 and '96, but
19 really I'm starting in 1997.

20 Q. Got it. So direct, you go '95
21 to 2018; indirect, you go from '97 to 2016.

22 A. That's correct.

23 Q. Okay. And that's just because
24 of just data limitations?

25 A. That's correct.

1 Q. If you had the other years, you
2 would use them in the indirect model?

3 A. That's correct.

4 Q. If you look at paragraph 82 of
5 your report, you describe your indirect model
6 as a form of residual analysis.

7 Do you see that?

8 A. Yes.

9 Q. And can you explain what a
10 residual analysis is?

11 A. Well, a residual is the
12 leftover part, and so a residual analysis is
13 an analysis that draws inferences not from
14 something included, but something excluded.

15 Q. Sort of like in accounting,
16 when you depreciate something, what's left
17 after you've depreciated it is the residual?

18 A. Is it? Yeah, perhaps.

19 Q. Except if the depreciation
20 somehow appreciates, but we won't go there
21 again.

22 What is the baseline of your
23 indirect model?

24 A. The baseline for the indirect
25 model as I just mentioned is the 1997 level

1 of MMEs.

2 Q. And you chose that because that
3 was the earliest year available in ARCOS?

4 A. Yes, that's correct.

5 Q. How did you construct the
6 explanatory variables you used in the
7 indirect model?

8 A. The explanatory variables come
9 from a variety of sources that I think we
10 reviewed at a very high level yesterday.
11 They're county level -- we haven't exactly
12 talked about. So this is a county level
13 cross-sectional analysis and we bring in data
14 from a variety of government economic sources
15 and other sources to capture county-level
16 information.

17 Q. And we spoke about this a
18 little yesterday with respect to Professor
19 Cutler.

20 A. Yes.

21 Q. But the same question for you:
22 Why did you decide to use national data and
23 do a national model for direct regression,
24 but then do your indirect regression analysis
25 based on county-level data?

1 MR. SOBOL: Objection, asked
2 and answered.

3 A. Sure. The time series analysis
4 that I did is appropriately done at the
5 national level. We're trying to calculate
6 national aggregate impact and the factors
7 that drive sales over time make sense to do
8 in -- at a national level there. We don't
9 have promotional data at a county level, so
10 it would not be possible to do a direct model
11 at this level.

12 On the other hand, and this is
13 why the indirect model complements the direct
14 model, we can look cross-sectionally at
15 variation in these socioeconomic and
16 demographic variables because there's a fair
17 amount of cross-sectional variation, and get
18 reasonably precise estimates of the effect of
19 those factors on MMEs.

20 And so the cross-sectional
21 model works at the county level, and then
22 rather than having to estimate the effects of
23 those variables over time, we can trend them
24 forward based on the cross-sectional
25 analysis.

1 BY MR. ROTH:

2 Q. If you look at paragraph 79,
3 which is on page 53, you say: The indirect
4 model begins with a regression analysis of
5 the relationship between opioid sales and the
6 demographic, economic and healthcare
7 characteristics of an area ideally during the
8 period prior to the misconduct.

9 Do you see that?

10 A. Yes, I do.

11 Q. So what do you mean when you
12 say ideally it would be from the period prior
13 to the misconduct?

14 A. Well, to the extent the
15 misconduct is affecting the relationships
16 between the right-hand side variables, those
17 are the demographic, socioeconomic and
18 healthcare variables that we include,
19 estimation during this period could -- could
20 affect the results.

21 And again, the level of MMEs in
22 1997, if the allegations are true, are
23 already affected by the misconduct, but I
24 believe this makes my analysis conservative
25 by starting two years into the damage

1 period -- or not the damage period, but the
2 period of alleged misconduct.

3 Q. So you're taking data from the
4 period of alleged misconduct in 1997 because
5 your assumption is the period of alleged
6 misconduct will be proven back to 1995?

7 A. That's correct.

8 Q. And you say this makes it
9 conservative because the factors may have
10 already been influenced and thus there would
11 be a higher likelihood to see prescriptions
12 from the demographic factors which have some
13 effect of the misconduct already?

14 A. Potentially.

15 Q. Okay. And what would be your
16 basis to think that the demographic, economic
17 and healthcare characteristics in Summit or
18 Cuyahoga Counties were already seeing the
19 effects of opioids in 1997?

20 A. Wait, so just to be clear,
21 actually, the -- what you just said doesn't
22 quite make sense, so let me just -- I
23 probably should have provided a much longer
24 answer to the last question.

25 So what the two things that

1 starting the analysis in 1997 do. One is I
2 start already with a level of MMEs that if
3 the allegations are true, they're inflated.

4 And, two, what I was trying to
5 say is it's not that the socioeconomic status
6 of the counties is affected, although that
7 can certainly happen in the long run, but
8 instead that the relationship between
9 socioeconomic status and MMEs may have
10 already been affected by the promotion.

11 So, you know, if, for example,
12 the marketing is differentially affecting
13 certain groups, then that could show up in
14 the cross-sectional analysis, and so that's
15 what I meant.

16 Q. And the reason you say it's
17 conservative is because directionally you
18 would think that the marketing would cause
19 those factors to predict more MMEs than they
20 would absent the marketing having already
21 occurred?

22 A. Yes. And again, the first
23 part, the fact that the levels directionally,
24 again, under the assumption that the alleged
25 misconduct had been occurring for two years,

1 the levels would certainly be inflated
2 relative to a but-for scenario in which there
3 was no misconduct.

4 Q. Do you agree that for an
5 indirect regression you should include any
6 variable that might impact opioid sales?

7 A. For the indirect regression, I
8 am including all the variables that should be
9 cross-sectionally associated with that, so
10 they -- just to be clear, that these are
11 variables that can be measured at a county
12 level, so not individual patient level, but
13 at a county level will vary across counties
14 and will predict use.

15 Q. And if there are variables that
16 are cross-sectionally related to sales that
17 are omitted, that could cause issues with
18 overestimating the amount of sales impacted
19 by promotion?

20 A. In any regression model, an
21 applied economist will have to consider the
22 possibility of omitted variables. It is also
23 in tension with the idea that if you throw in
24 hundreds of variables, you get nonsense soup
25 out of it, and so there's always going to be

1 some tension there, but certainly one
2 considers important omitted variables.

3 Q. Yeah, I mean, if I understand
4 it, the point of an indirect regression is to
5 essentially solve for a variable by including
6 everything but that variable that explains or
7 could explain the outcome?

8 A. Yes. I just want to be clear
9 that the word "everything" makes it seem like
10 you could actually estimate a regression with
11 hundreds of variables. There are degrees of
12 freedom. There can be problems from trying
13 to put everything in.

14 So in principle, you're right.
15 We're trying to make sure that we include the
16 important factors, and I believe I have done
17 so here.

18 Q. Okay. So I want to talk a
19 little bit about the mechanics first.

20 So you look at opioid shipments
21 by county, correct?

22 A. That's correct.

23 Q. And why did you use shipments
24 in your indirect model as opposed to
25 prescriptions?

1 A. These are words that describe
2 the same thing in effect. So these are the
3 ARCOS data. They use the terminology
4 shipments. They don't track prescriptions.
5 They track controlled substances that move
6 from one set of hands to another. And so
7 these are using their nomenclature.

8 At the end of the day, I --
9 these are MMEs, just like my MMEs in the
10 direct model. They correspond. And, in
11 fact, if you graph the two sets of data,
12 they're very close.

13 Q. Can the IQVIA NPA data be
14 disaggregated to a county level?

15 A. It cannot. Actually, I'm not a
16 hundred percent sure as I sit here. Again,
17 as we talked about yesterday, it's the
18 detailing data that definitely can't be
19 disaggregated. I can't remember whether the
20 NPA can be disaggregated too.

21 Q. So as you sit here, you're
22 not --

23 MR. SOBOL: You mean on its own
24 as opposed to using other tools?

25 MR. ROTH: No, I just mean

1 generally.

2 BY MR. ROTH:

3 Q. My question, just asking it
4 more broadly, is -- and it sounds like you
5 don't know the answer, so let me strike that
6 and start with a clean question.

7 You don't know whether you
8 could have used the same IQVIA data for MMEs
9 used in your direct model in your indirect
10 model at a county level?

11 A. I don't. I think the NPA is
12 just a national-level dataset. I did compare
13 MMEs in total in the ARCOS data to the IQVIA
14 data, and I found them to be almost
15 identical.

16 I note one place where the
17 ARCOS data are not detailed enough to allow
18 me to omit certain Schedule III codeines and
19 hydrocodones, I think. Yeah.

20 Q. And that was going to be my
21 next question.

22 A. Sure.

23 Q. So if you had used IQVIA data,
24 you could have taken out the Schedule IIIs,
25 but because you used ARCOS data, you had to

1 leave certain Schedule IIIs in your analysis?

2 A. That's correct. They're not --
3 you can't identify them because the data
4 aren't granular enough.

5 And I note in my report that
6 that affects about 2%. Just to be clear, I
7 realized it's not an error, but it's not a
8 hundred percent clear that that 2% is really
9 of those classes, of those molecules that
10 have both Schedule II and Schedule III drugs,
11 it's less than 1% of the total.

12 So again, when I compared the
13 ARCOS MMEs and the IQVIA MMEs, they look
14 almost identical.

15 (Interruption by the reporter.)

16 MR. ROTH: I think we need a
17 quick break.

18 THE VIDEOGRAPHER: The time is
19 9:04 a.m. We're off the record.

20 (Recess taken, 9:04 a.m. to
21 9:16 a.m.)

22 THE VIDEOGRAPHER: The time is
23 9:16 a.m. We're back on the record.

24 BY MR. ROTH:

25 Q. Just to go back to something we

1 were talking about before the break, so your
2 testimony is that picking '97 is conservative
3 because the unlawful conduct based on your
4 assumptions started in '95, correct?

5 A. Yes.

6 Q. You are aware that many of the
7 drugs at issue in this case were not on the
8 market in 1997?

9 A. I'm aware that certainly some
10 of the drugs enter later, yes.

11 Q. So for manufacturers who did
12 not have any drug on the market in '97 or
13 even '98 or '99 or until later, you actually
14 did choose a pre-misconduct period for those
15 manufacturers?

16 A. Well, again, I have been asked
17 to characterize the aggregate impact of
18 marketing on sales here, so I haven't -- and
19 I'm certainly not a lawyer, but I haven't
20 given a thought to allocating liability
21 across defendants in any way. I would
22 acknowledge that some defendants entered
23 later than that with some drugs.

24 Q. Right. And because you looked
25 at an aggregate, if a single manufacturer had

1 a product on the market, the remaining
2 manufacturers would all be subject to
3 whatever the aggregate model shows as the
4 impact from that one product even though it
5 wasn't theirs?

6 MR. SOBOL: Objection.

7 A. Well, I think that you
8 misunderstood the cross-sectional analysis.
9 So again, the cross-sectional analysis is
10 really capturing the effect of things like
11 the age distribution and employment and the
12 like. So that's not a question of something
13 to which liability is being attached.

14 So it's really just trying to
15 get a precise measure of those effects, and
16 yes, that's the basis for projecting forward,
17 but the projections forward, they don't
18 assign any liability to those early
19 relationships.

20 BY MR. ROTH:

21 Q. And just so we're perfectly
22 clear, none of the models or the work you've
23 done to date allows you to allocate liability
24 to an individual defendant in this case,
25 correct?

1 MR. SOBOL: Objection.

2 A. I don't know the answer to that
3 question because I don't know how liability
4 would be allocated. The models calculate
5 aggregate impact, and as I've shown in
6 Table 3, we can change that aggregate.

7 It is possible -- again, I
8 haven't been asked to do this, but it is
9 possible to use a similar approach to
10 construct one kind of liability allocation,
11 which would be to look at the levels of
12 detailing across defendants and use that in
13 Table 3 in a different way.

14 BY MR. ROTH:

15 Q. None of the work or models
16 you've done in this case allow you to
17 allocate liability to a specific defendant
18 based on only that defendant's alleged
19 promotion?

20 MR. SOBOL: Objection, asked
21 and answered.

22 A. Well, again, I'm not a lawyer,
23 but it seems to me that one method of
24 allocating liability is in proportion to
25 one's detailing efforts, and I have an

1 aggregate impact that can be allocated in
2 proportion to detailing using a similar
3 approach to the way Table 3 assesses
4 aggregate impact for different combinations
5 of defendants.

6 BY MR. ROTH:

7 Q. So I understand that your
8 Table 3 allows you to allocate to defendants
9 their share of the promotional contacts in
10 the data, correct?

11 MR. SOBOL: Objection, asked
12 and answered.

13 A. It is not based just on their
14 share of the promotional contacts, but it's
15 based on the difference in aggregate
16 prescribing that would occur with and without
17 their marketing happening.

18 So it's not -- as we talked
19 about yesterday, it's not strictly -- it goes
20 through the model.

21 BY MR. ROTH:

22 Q. Okay. Your assignment was to
23 develop an aggregate model of the impact of
24 detailing on MMEs, correct?

25 MR. SOBOL: Objection.

1 A. Just to be crystal clear, my
2 assignment was to estimate aggregate impact
3 using the best available methods.

4 BY MR. ROTH:

5 Q. Right. And you've said
6 numerous times throughout the last two days
7 that your assignment was not to determine
8 liability, correct?

9 A. Yes. I am -- I am not going
10 to -- my opinions relate to the effect of
11 marketing, and how that relates to liability
12 and recovery is not part of my assignment.

13 Q. Okay. So unless the court
14 allows the plaintiffs to prove liability
15 based on each individual defendant's share of
16 aggregate marketing, you have no mechanism to
17 allocate liability on an individual defendant
18 basis?

19 MR. SOBOL: Objection, asked
20 and answered.

21 A. I think you're asking me for a
22 legal opinion. I don't know. It seems that
23 the court could -- could allow plaintiffs to
24 allocate liability in a number of different
25 ways. I don't know how that would work.

1 BY MR. ROTH:

2 Q. I understand that. I'm not
3 asking you for a legal opinion. I just want
4 to understand what you're going to do at
5 trial, okay? Okay?

6 MR. SOBOL: The buzzword is --
7 when you're using the word "liability"
8 in the question, that's the buzzword
9 that's sending her down that road. So
10 if you -- I'm coaching you now.

11 MR. ROTH: Well, I understand
12 that, but I'm also trying to -- I know
13 you guys want ultimate flexibility on
14 your side but you shouldn't have it on
15 this point, so I want to make sure the
16 record is clear, okay?

17 BY MR. ROTH:

18 Q. Professor Rosenthal, your
19 regression models that you have done to date
20 do not allow you to allocate causation to
21 individual defendants in any way other than
22 as a ratio of those defendants' detailing
23 contacts against the market aggregate
24 detailing contacts?

25 MR. SOBOL: Objection to form,

1 asked and answered.

2 But you may answer.

3 A. You have used the terminology
4 as a ratio, and that is not what happens in
5 Table 3.

6 So again, I don't know what the
7 court will want, but what I can do with my
8 aggregate model is I can use the econometric
9 results and create different but-for
10 scenarios, one set of which would be to focus
11 on individual defendants isolated from
12 others.

13 That's similar to what I've
14 done in Table 3, but that's not allocating
15 based on a ratio. It's rerunning the but-for
16 scenario, the predictions using a defendant's
17 detailing, and that detailing is not just a
18 single number. It's a time series.

19 BY MR. ROTH:

20 Q. Let me try this again.

21 Your regression models that you
22 have done do not allow you to allocate
23 causation to individual defendants in any way
24 other than separating out those defendants'
25 detailing contacts from the market aggregate

1 detailing contacts?

2 MR. SOBOL: Objection to form,
3 asked and answered.

4 A. My analysis allows me to
5 predict but-for prescriptions based on any
6 level of detailing, including the assumption
7 that only a single defendant's detailing was
8 unlawful, and there may be other ways of
9 using the aggregate model to estimate
10 liability, except that I'm not a liability
11 expert. There may be other ways that I just
12 don't know of.

13 I can identify MMEs. I can
14 identify detailing for each defendant. That
15 information may be used in other ways that I
16 haven't thought of because I don't know what
17 the court will need.

18 BY MR. ROTH:

19 Q. How do your models allow you to
20 predict but-for detailing assuming only a
21 single defendant's detailing was unlawful
22 without running afoul of the endogeneity
23 issues that we've discussed?

24 MR. SOBOL: Objection.

25 You can answer.

1 A. Because again, the endogeneity
2 issues are in the estimation of the
3 parameters. The but-for scenarios take the
4 estimates that are created at the aggregate
5 level, and they feed into it an alternative
6 set of detailing information. So they're
7 post-estimation.

8 Endogeneity is pre-estimation,
9 and all I'm doing is changing the simulation
10 of the but-for scenario.

11 BY MR. ROTH:

12 Q. Let's go back to the indirect
13 model for a bit.

14 Based on your assertion that
15 opioid pharmaceutical efforts are national in
16 scope and that marketing messages are
17 developed as a whole, would you expect a
18 single detail in one county to have the same
19 effect as a single detail in another county?

20 MR. SOBOL: Objection.

21 You can answer.

22 A. I don't know what the
23 variability and the effect of detailing is
24 per se. I expect that there would be some
25 variation in the effectiveness of detailing

1 from situation to situation.

2 And my model and my assumptions
3 in the indirect model, since I don't model
4 promotion directly, is that what I'm aiming
5 to calculate is the average effect, and
6 therefore, calculate the aggregate impact
7 from that average.

8 BY MR. ROTH:

9 Q. Is it possible that shipments
10 to a county could understate or overstate
11 consumption of opioids in that county?

12 A. Yes, it is possible that
13 shipments to a county -- so once we get to
14 the county level, there are -- there are
15 issues related to diversion.

16 Q. And I think Professor Gruber
17 describes that as a transshipment problem in
18 his report?

19 A. I think he does. There's a
20 fancy name for the Florida transshipments, I
21 can't remember what it was called, but yes.

22 Q. Did you consider using
23 geographic designations that account for
24 commuting patterns?

25 A. No, I did not. The

1 county-level data I think are the most
2 appropriate level of analysis. Any
3 geographic unit will have some people moving
4 in and out, but the county level, I think is
5 an appropriate level of analysis.

6 The economic and
7 sociodemographic -- demographic and
8 socioeconomic variables are measured at the
9 county level, and we think about these sort
10 of economic issues as being approximately
11 captured at the county level.

12 Q. Did you consider core-based
13 statistical areas instead of counties?

14 A. I did not.

15 Q. For the same reason that you
16 just gave?

17 A. Yes. There are -- the ARCOS
18 data are at the county level, and again, most
19 economic data are tracked at the county
20 level. There are some data that are focused
21 on urban cores, but not the kind of
22 comprehensive data that I used here.

23 Q. Did you consider using
24 metropolitan statistical areas?

25 A. The same answer. I did not.

1 That would be aggregating up. MSAs also
2 split certain counties. It doesn't make
3 sense to me to move up a level. The county
4 level is more granular than the MSA level.

5 Q. In certain places, though, the
6 county level may actually be larger than the
7 MSA, right?

8 A. That is true in urban areas.
9 In rural areas, MSAs include multiple
10 counties. They're not precisely overlapping,
11 I know from having done some matching at some
12 point, they're not easy to cross-walk.

13 Q. Okay. So back to paragraph 83
14 of your report. So you say as you just said
15 that you used county-level ARCOS data on
16 shipments of prescription opioids between
17 1997 and 2016, correct?

18 A. Yes.

19 Q. But ARCOS actually doesn't have
20 county-level data, does it?

21 A. The -- I believe the data are
22 mapped to counties.

23 (Whereupon, Deposition Exhibit
24 Rosenthal-22, Data Appendix, was
25 marked for identification.)

1 BY MR. ROTH:

2 Q. That's right. So let's look at
3 Exhibit 22, which is the data appendix that I
4 believe you shared with Professors Cutler and
5 Gruber?

6 A. That's right. As I mentioned,
7 the ARCOS data for me come through Compass
8 Lexecon.

9 Q. Okay. So we spoke yesterday
10 about who helped you with your report, and it
11 was Greylock McKinnon. Other than giving you
12 the ARCOS data, did Compass Lexecon have any
13 role in the preparation of your expert
14 report?

15 A. No role in the preparation of
16 my expert report, no.

17 Q. And did you speak with anyone
18 from Compass Lexecon directly?

19 A. Yes, we talked about those
20 meetings, and perhaps some of the calls,
21 there were people from Compass Lexecon on
22 those.

23 Q. But in terms of your regression
24 analyses and running the Wald statistical
25 tests, that was all Greylock and yourself;

1 that was not Compass Lexecon?

2 A. Yes, that's correct, my staff
3 ran these.

4 Q. Okay. So if we look at
5 Exhibit 22, turn to page 11, and it's a
6 section on the ARCOS prescription shipment
7 data.

8 Do you see that?

9 A. Yes.

10 Q. Do you know who prepared this
11 document?

12 A. I do not, no.

13 Q. It was not you or your staff as
14 far as you know?

15 A. It was not me or my -- it
16 certainly was not me. I do not believe it
17 was my staff.

18 Q. So on the top of page 12, it
19 says: The Drug Enforcement Agency, DEA,
20 provides data on shipments of prescription
21 opioids over time and across geographies.
22 This appendix describes the source of these
23 data and the steps taken to process and set
24 up the data for analysis.

25 Do you see that?

1 A. Yes.

2 Q. Then also on page 12, we'll get
3 to this later, but it shows the DEA drug
4 codes and names in the ARCOS data which are
5 at the molecule level.

6 A. That's right.

7 Q. And that was why you couldn't
8 separate out the Schedule IIIs, as we
9 discussed?

10 A. That's correct.

11 Q. And then if you turn to
12 page 13, the next page.

13 A. Yeah.

14 Q. Sorry, it's actually on
15 page 14. That's my errata.

16 Do you see the section mapping
17 shipments from three-digit ZIP codes to
18 counties?

19 A. Yes, I do.

20 Q. It says: As noted above, the
21 most detailed geographic area reported in the
22 public ARCOS reports is the three-digit ZIP
23 code. Three-digit ZIP codes are based on the
24 first three digits of standard U.S. postal
25 ZIP codes. These areas typically, but not

1 exclusively, span across more than one county
2 and thus are not directly comparable to the
3 county level of data available for mortality,
4 crime and geographic -- I'm sorry, crime and
5 demographic and economic statistics.

6 Do you see that?

7 A. I do.

8 Q. And were you aware of that
9 issue?

10 A. I was at one level. I had
11 forgotten that there was a cross-walk from
12 three-digit ZIPs, which themselves, again,
13 are geographic areas that vary in terms of
14 how big they are.

15 Q. Do you know how Cuyahoga County
16 compares to the three-digit ZIPs that are
17 reflected in the ARCOS data for that area?

18 A. I'm sorry, I do not.

19 Q. Do you know how Summit County
20 compares to the three-digit ZIPs for that
21 part of Ohio?

22 A. No, I did not.

23 Q. And if you look at page 15, it
24 says: In order to link the ARCOS shipments
25 data to the other county data, we have

1 allocated shipments based on the weighted
2 average population of census block centroids,
3 center points that fall within each county
4 that a three-digit ZIP code crosses. And
5 then this means that when a three-digit ZIP
6 code crosses county boundaries, we use the
7 population at the census block level to
8 estimate the share of population across
9 counties for the three-digit ZIP.

10 Do you see that?

11 A. I do.

12 Q. An underlying assumption to
13 this approach is that the shipments per
14 capita within a three-digit ZIP code are the
15 same across census blocks.

16 Do you see that?

17 A. Yes.

18 Q. And when it says "we have
19 allocated," do you know who did that work?

20 A. Compass Lexecon, but I don't
21 know who in particular.

22 Q. And did you do anything to test
23 Compass Lexecon or whomever's underlying
24 assumption that shipments per capita within a
25 three-digit ZIP code are the same across

1 census blocks?

2 A. I did not, no. I don't think
3 it's possible to do that with these data
4 because there aren't census block level data
5 in ARCOS.

6 Q. And then they explain their
7 methodology below with the mathematical
8 formula of how they allocated ARCOS drug
9 shipment totals to the counties based on
10 population share?

11 A. That's right.

12 Q. And that's not an analysis
13 you've seen before?

14 A. I'm sorry, what do you mean?
15 I've seen this data appendix.

16 Q. Have you seen the analysis for
17 how Compass Lexecon allocated ARCOS shipments
18 to the counties?

19 A. I guess I don't know what you
20 mean by "seen." I understand that they
21 allocated based on population using this
22 formula, so have I seen the individual
23 calculations, is that what you're asking?

24 Q. Correct.

25 A. No, I have not.

1 Q. Okay. And you would agree that
2 just because a product is shipped to certain
3 counties does not mean it's consumed there?

4 MR. SOBOL: Objection, asked
5 and answered.

6 A. I think as explained in -- in
7 the Cutler report, and Gruber may have said
8 it also, to the extent that shipments are
9 moving from one county to another, this
10 regression methodology will -- it will just
11 contribute to noise essentially in the
12 regression.

13 So it's -- that -- the fact
14 that there may be understatement of shipments
15 in Ohio -- I think that's the premise here --
16 because there's overstatement somewhere else
17 because they moved from one place to another,
18 that itself won't bias this analysis. It may
19 create some noise.

20 BY MR. ROTH:

21 Q. What is your basis for thinking
22 there's an understatement of shipments to
23 Ohio in the ARCOS data?

24 A. Well, again, it's really
25 reading Cutler and Gruber's reports and the

1 notion of the -- I guess it was the
2 Oxy Express, so the shipments go to Florida,
3 but they ultimately end up in Ohio and
4 Kentucky and places like that.

5 Q. And have you done any analysis
6 as to how the Oxy Express influenced
7 consumption of prescription opioids in Ohio?

8 A. No, I have not.

9 Q. Do you agree that the census
10 data on population is not necessarily
11 connected to where opioids are consumed?

12 A. Allocating shipments based on
13 population is a reasonable approach, and I
14 think, you know, as they say in footnote 24,
15 this is -- it's very common that we make such
16 geographic cross-walks just because the way
17 data are presented. It's a reasonable basis
18 for allocating shipments in my opinion.

19 Q. I understand you think it's a
20 reasonable basis. I'm not asking that.

21 I'm just asking the factual
22 question. Where the population is shown in
23 the census data is not necessarily correlated
24 to where the shipments are consumed?

25 MR. SOBOL: Objection.

1 A. Well, it almost --

2 MR. SOBOL: Asked and answered.

3 A. It almost certainly is
4 correlated because you need peoples -- people
5 to have consumption, but exactly what the
6 relationship is, I can't say for sure. But
7 again, it almost surely is a major factor in
8 determining where the consumption is. It may
9 not be perfectly correlated.

10 BY MR. ROTH:

11 Q. And people don't necessarily
12 consume prescription opioids in their homes,
13 right?

14 MR. SOBOL: Objection.

15 A. Well, I don't think that that's
16 the -- that's the relevant question for my
17 analysis. Again, I'm really looking at what
18 factors predict shipments here, so wherever
19 people consume them.

20 BY MR. ROTH:

21 Q. But you understand that your
22 analysis is feeding into Professor Cutler's
23 analysis and Professor McGuire's analysis who
24 are trying to compute harms and damages
25 occurring within Summit and Cuyahoga County?

1 A. It's true, but the way my
2 indirect analysis feeds into Professor
3 Cutler's analysis is in the aggregate.

4 Q. If you turn to paragraph 84,
5 that lists, I believe, all the variables you
6 include in the indirect model; is that
7 correct?

8 A. Yes.

9 Q. So you've got three categories,
10 demographic, economic and healthcare
11 variables.

12 A. That's right.

13 Q. Let's take those one at a time.
14 So the demographic variables
15 you include are essentially gender, male
16 versus female?

17 A. Yes.

18 Q. The percent in different age
19 groups set out in your report as to how you
20 divided them, it looks like into five
21 different age -- six different age group --
22 five different age groups?

23 A. Sure. Sorry, these are just
24 standard census categories.

25 Q. Okay. Another demographic

1 factor you included is the percent of the
2 population that is white, black and
3 Hispanic --

4 A. Yes.

5 Q. -- so race.

6 And then the share of the
7 population in four different education
8 groups, correct?

9 A. Yes.

10 Q. And the percent of the county
11 identified as urban, correct?

12 A. That's right.

13 Q. And are all of those census
14 categories?

15 A. I believe so, yes. I think
16 they all come from the ASEC that we talked
17 about.

18 Q. Okay. And then in the second
19 category, economic variables, you included
20 the unemployment rate?

21 A. Yes.

22 Q. You included
23 employment-to-population ratio?

24 A. Yes.

25 Q. You included the distribution

1 of employment by major industry sector?

2 A. Yes.

3 Q. You included median household
4 income?

5 A. Yes.

6 Q. You included the poverty rate?

7 A. Yes.

8 Q. And you included the county's
9 population?

10 A. Yes.

11 Q. And then for healthcare, you
12 only included two variables, correct?

13 MR. SOBOL: Objection.

14 You can answer.

15 A. Yes, I included two healthcare
16 variables.

17 BY MR. ROTH:

18 Q. And one was the percentage of
19 the population without insurance, correct?

20 A. That's correct.

21 Q. And the second variable is the
22 number of cancer deaths, correct?

23 A. That's correct.

24 Q. Why did you include a variable
25 to account for the percentage of the

1 population without insurance?

2 A. I included that variable
3 because I thought that there might be
4 relatively widespread coverage differences
5 across counties and that that might explain,
6 as I think we talked a little bit about
7 yesterday, the extent to which people go to
8 the doctor and therefore get a prescription,
9 and also, their likelihood of filling a
10 prescription.

11 Q. Insurance coverage, though, is
12 not a variable you included in your direct
13 model?

14 A. That's correct. And I'm sure
15 we'll continue to come back to this, but the
16 cross-sectional variation, insurance coverage
17 is a lot more substantial across counties
18 than it is over time.

19 Q. In your -- what I'll call
20 thought experiment, which we'll talk about in
21 a minute, you include as potentially
22 medically allowable prescriptions, surgery
23 and trauma; is that right?

24 A. Yes. I guess we'll discuss the
25 right words to describe that, but yes, so as

1 the potentially appropriate uses, something
2 like that I think is what I say, that
3 surgical and trauma conditions, yes.

4 Q. But in your indirect model you
5 don't have any variables for either surgery
6 or trauma?

7 A. I do not, no.

8 Q. And why is that?

9 A. Well, the data from the
10 healthcare utilization project that we
11 will -- we'll talk about later, those cannot
12 be disaggregated. There are some state-level
13 data, but they're considered to not be
14 reliable for that purpose, so those are
15 national data only.

16 And ultimately, the trends in
17 those -- sorry, wrong question, I was
18 answering the direct model.

19 And ultimately, those factors,
20 the numbers there, I don't believe that we
21 have reliable estimates across counties over
22 the entire time period.

23 Q. I'm a little confused because
24 you just said the surgery and trauma
25 figures --

1 A. Yeah.

2 Q. -- cannot be disaggregated, but
3 I thought in your last section you have a
4 disaggregation of potentially appropriate
5 MMEs for Summit and Cuyahoga that includes
6 trauma and surgery.

7 A. Yeah, the HCUP data, those data
8 are not at the county level. The other data
9 are at the county level, the Area Health
10 Resources File. So I was distinguishing
11 between those two.

12 And in general, you can see,
13 when we get to the appropriate uses, that
14 the -- those trend downwards, and so even if
15 we were to include those in the model and
16 they had a cross-sectional relationship, it
17 would not cause the indirect estimate to be
18 increasing.

19 Q. But you didn't actually include
20 those in the model?

21 A. I didn't, no.

22 Q. Did you consider any other
23 variables to include in any of the three
24 categories, demographic, economic or
25 healthcare, in your indirect model, aside

1 from the ones we've discussed?

2 A. No, these are the variables --
3 these variables are based on previous
4 literature, all of those demographic and
5 socioeconomic variables come from an
6 assessment of what has been shown to be
7 associated with opioid use.

8 Q. And what literature assessing
9 the variables associated with opioid use are
10 you relying on?

11 A. Well, I don't think I have a
12 citation in here, so I don't know a specific
13 paper as I sit here. Again, these are --
14 these are variables that economists studying
15 opioid use have used from the census data.

16 This is the source of data that
17 have been used by researchers. I think most
18 of that literature is cited in Professor
19 Cutler's report.

20 Q. Okay. And is -- was the list
21 of variables you would use in your indirect
22 model a subject of discussion between
23 yourself and Professor Cutler?

24 A. I can answer that if counsel
25 were present?

1 MR. SOBOL: Well, yes or no.

2 A. Yes.

3 BY MR. ROTH:

4 Q. So if you look --

5 MR. SOBOL: You got so used to
6 just running on that you forgot you
7 could answer yes or no.

8 BY MR. ROTH:

9 Q. If you look at page 25 of
10 Exhibit 22.

11 A. Okay. This is the data
12 appendix?

13 Q. Yes.

14 A. Yeah. The Table 2?

15 Q. Yes.

16 So this is a table that
17 reflects economic and demographic variables
18 with data sources and years reported.

19 A. Uh-huh.

20 Q. And this is the shared
21 appendix, but I assume these are the
22 variables we've been discussing that you used
23 in your indirect regression?

24 A. Yes, they are.

25 Q. Okay. So if you look at

1 several of the rows, there's a shaded gray
2 bar that says Interpolated.

3 Do you see that?

4 A. Yes, that's right.

5 Q. And what does that mean?

6 A. Well, some of the variables
7 come only from the decennial census, so we
8 have them for every ten years, so a linear
9 interpolation was used between those ten-year
10 points.

11 Q. And how do you know it was a
12 linear interpolation?

13 A. Well, I should read more
14 closely. I believe it is a linear
15 interpretation, but my memory is not to be
16 trusted.

17 Q. You know what, you're right.
18 Actually, it says that at the bottom of the
19 chart. Interpolated values are a linear
20 interpolation between the preceding and
21 following measured value.

22 A. Someone should do something
23 about that font size.

24 Q. Who performed the linear
25 interpolation on the census data for the

1 variables that were interpolated?

2 A. I do not know the specific
3 individual. These were constructed by
4 Compass Lexecon.

5 Q. Did you consider picking a year
6 where you did not need to do interpolation,
7 such as the year 2000, as your baseline?

8 A. No, I did not consider that.

9 Q. Are you using interpolated
10 values for these variables in your 1997
11 baseline?

12 A. Yes, I am.

13 Q. Is it possible the interpolated
14 variables affect the baseline estimated
15 relationship between the explanatory
16 variables and shipments per capita per day?

17 MR. SOBOL: Objection to form.

18 A. These socioeconomic and
19 demographic variables change very slowly, and
20 I believe the linear interpolation method is
21 entirely appropriate.

22 I do not believe that they are
23 likely to cause any impact on my analysis,
24 but if any, they would be a source of
25 mismeasurement, which would dampen -- which

1 would basically cause noise, but not bias.

2 BY MR. ROTH:

3 Q. Have you studied the linear
4 interpolation that was done and how it might
5 impact your analysis?

6 A. Well, I'm not exactly sure how
7 one would study such a thing. Again, we
8 undertake the interpolation because those
9 data were not captured in those years, so
10 there's not a gold standard to compare the
11 linear interpolation to.

12 Q. But what you could do is pick a
13 year where no interpolation were needed and
14 compare the results from that year, say 2000,
15 against '97 with the interpolation?

16 MR. SOBOL: Objection.

17 A. Well, as we discussed earlier,
18 my effort was to undertake the
19 cross-sectional analysis in a year that was
20 unaffected by the alleged misconduct, and
21 1997, while imperfect, is a bit closer to
22 that.

23 2000 would be a time period in
24 which the alleged misconduct was well under
25 way, so I did not consider such an analysis.

1 BY MR. ROTH:

2 Q. And when you say the alleged
3 misconduct was well under way in 2000, that's
4 based on your assumption that it started in
5 1995 as opposed to a review of actual
6 promotion that occurred between '95 and 2000?

7 MR. SOBOL: Objection.

8 A. Well, again, I am assuming that
9 plaintiffs' counsel will prove their case.
10 As you know, there's quite a bit of evidence
11 that I can't evaluate from a legal
12 perspective that I can see as a layperson
13 that suggests marketing messages related to
14 opioids were, in fact, dampening the sense of
15 the addictive properties of these drugs.

16 Whether or not that's unlawful
17 I can't say, but I can certainly see that
18 what the allegations describe was happening
19 during this period.

20 BY MR. ROTH:

21 Q. Do you understand -- well,
22 strike that. Let me ask it a different way.

23 Does your model assume that
24 unlawful detailing occurred even if that
25 detailing were solely based on FDA-approved

1 labels or marketing materials?

2 MR. SOBOL: Objection, asked
3 and answered.

4 A. Well, you're asking me to
5 assume a hypothetical in that case, I think,
6 that all marketing was based on FDA-approved
7 labels.

8 BY MR. ROTH:

9 Q. I don't think so. I think what
10 I'm asking is your model treats all of
11 defendants' promotion as unlawful based on
12 the assumption that you made based on the
13 instruction of counsel, correct?

14 MR. SOBOL: Objection, asked
15 and answered.

16 A. Yes. I have been asked to
17 assume that plaintiffs will prove that in
18 sum, defendants' marketing was unlawful.

19 BY MR. ROTH:

20 Q. Okay. And if, in fact, a
21 defendant or subset of defendants only
22 promoted using FDA-approved labeling and/or
23 FDA-approved marketing materials, how does
24 your model address that?

25 MR. SOBOL: Objection, asked

1 and answered.

2 A. I think you're asking me a
3 legal question, so I do not know whether such
4 a hypothetical would have -- would exclude
5 the possibility that the conduct was unlawful
6 in some other way. I don't know.

7 BY MR. ROTH:

8 Q. Just assume my hypothetical is
9 so, okay? Don't fight the hypothetical.

10 If for a given defendant it is
11 proven that all promotion was solely based on
12 FDA-approved labeling and FDA-approved
13 marketing materials, your model still
14 includes those promotional contacts in
15 calculating the aggregate impact, correct?

16 MR. SOBOL: Objection, asked
17 and answered.

18 A. I guess I'm trying to
19 understand. We've been talking about my
20 indirect model, which does not include a
21 measure --

22 BY MR. ROTH:

23 Q. Yeah. I'm back to the direct
24 for this question. I'm back to direct for
25 this question.

1 A. Going back to --

2 Q. Let me reask it because we're
3 talking over each other.

4 If for a given defendant it is
5 proven that all promotion was solely based on
6 FDA-approved labeling and FDA-approved
7 marketing materials, your direct model still
8 includes that defendant's promotional
9 contacts in calculating the aggregate impact,
10 correct?

11 MR. SOBOL: Objection, asked
12 and answered, misstates prior
13 testimony.

14 A. I do not know whether a
15 hypothetical in which the marketing were
16 based solely on FDA-approved materials is in
17 any way in contradiction to the assumption
18 that that marketing can be proven unlawful.
19 That is a legal question, the answer to which
20 I do not know.

21 BY MR. ROTH:

22 Q. Now if you turn to paragraph 81
23 of your report, and now we're back to the
24 indirect model.

25 In paragraph 81, you say:

1 Based on these estimates of the relationship
2 between the economic, demographic and
3 healthcare characteristics of counties and
4 opioid sales before the opioid epidemic took
5 hold, the model can be used to predict opioid
6 sales using only changes in the X-i variables
7 over time.

8 Do you see that?

9 A. I do.

10 Q. And then you say: A modified
11 version of this approach incorporates an
12 estimated secular trend also using data from
13 the pre-misconduct period.

14 Do you see that?

15 A. I do.

16 Q. So what is a secular trend?

17 A. Secular trend here, it's
18 literally a linear trend that I calculate
19 using sort of a long series of pre-alleged
20 misconduct data.

21 Q. That's based on the growth rate
22 in opioid sales from 1980 to 1995?

23 A. That's correct.

24 Q. And that trend would include
25 obviously only the molecules that were

1 approved and sold at that time, correct?

2 A. By definition, yes.

3 Q. And I think that would mean it
4 would include morphine, pethidine, oxycodone,
5 fentanyl and hydromorphone.

6 Does that sound right?

7 MR. SOBOL: Objection.

8 A. I am not a hundred percent sure
9 so I would have to actually look at the INCB
10 data.

11 BY MR. ROTH:

12 Q. So do you know which molecules
13 are included in the secular trend and which
14 are not?

15 A. The data from the INCB are like
16 the ARCOS data, they're at the molecule
17 level. I just -- as I sit here, I can't
18 remember, but the analysis was done to
19 include the analogous products, recognizing
20 that there are new entrants that happen after
21 1995.

22 Q. Do you know whether or not the
23 INCB data from 1980 to 1995 includes
24 hydrocodone?

25 A. I do not as I sit here.

1 Q. Do you know whether the INCB
2 data from 1980 to 1995 includes propoxyphene?

3 A. I -- as I sit here, I do not.
4 I'm trying to remember if it's actually in my
5 Appendix D.

6 Q. If it is, I'm happy to look at
7 it. I don't --

8 A. Yeah.

9 Q. -- know if it is or not. It
10 may also be in that data appendix I gave you.

11 But so we don't get bogged down
12 on it --

13 A. Sure.

14 Q. -- it's fair to say, whatever
15 drugs are listed in the INCB data from 1980
16 to 1995 are included in the secular trend,
17 correct?

18 A. I believe so, yes.

19 Q. And any drugs that are not
20 listed in that data are not included in the
21 secular trend?

22 A. I think that's right, yes.

23 Q. And if any of the opioids not
24 included in the secular trend grew at a
25 faster rate than those included, your

1 indirect model would not fully account for
2 the intended market-expanding effects of
3 promotion for those molecules?

4 MR. SOBOL: Objection.

5 A. Again, adding the secular trend
6 in my opinion is very conservative here to
7 begin with. My intent was to capture all the
8 relevant molecules, basically those that map
9 to the market that I'm looking at post 1995,
10 recognizing that there are changes over time.

11 And so this secular trend in my
12 indirect model is intending to capture
13 defendant -- non-defendant, sorry,
14 promotion -- that's an important verbal
15 errata.

16 So as already, because some of
17 the defendants may be involved in that early
18 data, they may be picking up some of the
19 alleged misconduct, if some of it occurs
20 before 1995, I think I'm not as concerned
21 about underestimating that trend.

22 BY MR. ROTH:

23 Q. But just so I understand, if
24 the opioids omitted from the secular trend
25 grew at a faster rate than the included

1 molecules, your indirect model would fail to
2 account for the intended market-expanding
3 effects of non-defendant promotion?

4 MR. SOBOL: Objection, asked
5 and answered.

6 A. Again, I believe that I
7 included the molecules that were appropriate
8 for inclusion. I don't know that there are
9 any that should have been included that
10 weren't.

11 My intention was to capture the
12 set of molecules that -- that were similar --
13 were basically the available alternatives
14 over that period to -- as opioid analgesics.
15 And if there -- I guess if there were any
16 that are omitted, I could identify those and
17 adjust the trend if need be.

18 BY MR. ROTH:

19 Q. Before your post-estimation
20 secular trend and aggregate price
21 adjustments, are your predicted values of
22 shipments per capita per day influenced only
23 by changes in the demographic, economic and
24 healthcare explanatory variables?

25 A. I don't know what you mean by

1 "only," but the -- as you can see in Table 4,
2 there are a number of significant
3 relationships across those demographic,
4 socioeconomic and healthcare variables, and
5 there are about 20 variables included there
6 in total.

7 Q. And since you've directed me to
8 Table 4, what does it mean, "no obs," is that
9 number of observations, 404?

10 A. Yes, I'm sorry. We're not very
11 generous with our shorthand, are we? Yes,
12 that's the number of observations.

13 Q. What does that mean exactly?

14 A. That's the number of counties
15 in the sample.

16 Q. Okay. And the R-squared of the
17 indirect model is 33%?

18 A. That's correct.

19 Q. Which is not 99.6%.

20 A. As I note in the chapter,
21 cross-sectional regressions never have the
22 same R-squared as time series analysis.

23 Q. Did you consider the prediction
24 intervals for your predicted shipments per
25 capita per day?

1 A. What do you mean by the
2 prediction intervals?

3 Q. Yeah. Did you consider upper
4 and lower bounds for your predictions?

5 A. You mean by setting the
6 independent variables to extreme levels? I'm
7 still not sure what you're talking about.

8 Q. Yeah, I think that's right.

9 A. I did not look at trying to
10 predict out of sample. I'm interested in
11 using these variables to be able to then take
12 the trends in the underlying demographic,
13 socioeconomic and healthcare factors and
14 predict forward in the ranges that those
15 variables hold. So I did not look at extreme
16 values.

17 Q. Okay. If you look at
18 paragraph 88, you talk about how you adjusted
19 for price impact in the indirect model?

20 A. Yes.

21 Q. And then you say: There's
22 little county-level variation in opioid
23 prices so this variable does not appear in
24 the cross-sectional model, despite the fact
25 that my direct model shows a small but

1 significant negative effect of price on sales
2 over time.

3 Do you see that?

4 A. I do.

5 Q. And what is your basis for the
6 statement that there's little county-level
7 variation in opioid prices?

8 A. That's based on my knowledge
9 and experience as a health economist who has
10 done a lot of work on pharmaceutical pricing.
11 As you may know, pharmaceutical manufacturers
12 report list prices, and those list prices are
13 the basis for retail transaction prices.

14 Q. AWP?

15 A. AWP.

16 Q. Have you done any analysis
17 specific to opioid products and potential
18 price variation across counties?

19 A. I have not calculated that
20 variation in this matter, no.

21 Q. And in your direct model you
22 acknowledge there is a small but significant
23 downward effect of price on sales over time?

24 A. Yes, which is why I adjust for
25 it here.

1 Q. And how do you adjust for it?
2 That's how you described it in paragraph 88,
3 by changing the estimated coefficient on the
4 drug price index?

5 A. So I used the estimated
6 coefficient from the direct model and then
7 the trend in prices in order to project that
8 price effect.

9 Q. So you use your direct model's
10 output for the price coefficient, and then as
11 you say, adjust for the trend in prices?

12 A. That's correct.

13 Q. Okay. Can we agree generally
14 that omitted variables can cause bias in
15 regression analyses?

16 A. The concern about omitted
17 variables is a ubiquitous one in any
18 econometric analysis. I believe that I have
19 appropriately captured the most important
20 variables in my analysis.

21 Q. And do you agree that to the
22 extent that other factors not modeled in the
23 baseline regression contributed to increases
24 in opioid shipments, the indirect approach
25 has the potential to overstate the impact of

1 promotion on shipments?

2 MR. SOBOL: Objection, asked
3 and answered.

4 A. I'm not aware of any variables
5 that should be in the model that would make a
6 substantial effect here. If such a variable
7 existed, it could affect the calculations in
8 the way that you suggest.

9 BY MR. ROTH:

10 Q. Okay. You did not include a
11 variable reflecting the number of military
12 veterans in the counties, did you?

13 A. No, I did not.

14 Q. Do you agree the number of
15 veterans in a county could increase the
16 amount of MMEs sold?

17 A. I don't know as I sit here
18 whether that's a reasonable thing to posit.

19 Q. You've not looked at any
20 literature as to whether veterans require
21 more opioids than other citizens?

22 A. I have not, and you have to
23 keep in mind that there are a number of other
24 variables in the model that will be
25 correlated with the number of military

1 veterans or any other sociodemographic group,
2 if that's appropriate to call military
3 veterans a sociodemographic group, such as
4 the educational distribution, ages, those
5 things may well pick up some effects, if any
6 exist.

7 Q. Okay. But you didn't include
8 veterans specifically?

9 A. I did not.

10 Q. You did not include a variable
11 reflecting the number of doctors in the
12 county, correct?

13 A. I did not include a variable
14 reflecting the number of doctors in the
15 county.

16 Q. Can we agree that the number of
17 doctors in a county can affect the amount of
18 MMEs prescribed and sold in that county?

19 A. It's possible, but again, the
20 variables that are included in my model I
21 believe would be correlated with the number
22 of doctors in a county, so rurality, for
23 example, will be correlated with the number
24 of doctors, the percent uninsured will be
25 correlated with the number of doctors, and I

1 believe the included variables in my model
2 are sufficient to pick up those effects.

3 Q. Okay. You did not include a
4 variable reflecting the number of hospitals
5 in a county?

6 A. I did not include a variable
7 reflecting the number of hospitals in the
8 county, and again, I believe the demographic
9 and socioeconomic variables in my model will
10 be correlated with the presence of hospitals,
11 and therefore I am not concerned about the
12 bias from that exclusion.

13 Q. Would you agree the number of
14 hospitals in a county could influence the
15 amount of MMEs prescribed and sold in that
16 county?

17 A. I believe as a factor it could
18 have some effect, and that the variables that
19 I include in my model will be sufficiently
20 correlated with that, that the omission of
21 the number of hospitals will not bias my
22 results.

23 Q. You did not include a variable
24 reflecting the number of pharmacies in a
25 county?

1 A. I did not include a variable
2 reflecting the number of pharmacies, and like
3 any other measure of economic activity, I
4 believe that will be strongly correlated with
5 the socioeconomic variables that I do include
6 in my model.

7 Q. Would you agree that the number
8 of pharmacies in a county may increase the
9 amount of MMEs shipped to that county?

10 A. Ignoring the fact that the
11 other factors that I include may well account
12 for that effect as an independent matter, the
13 number of pharmacies may affect the number of
14 shipments in a county.

15 Q. Did you include a variable on
16 the incidence of cancer in a county?

17 A. I included cancer deaths rather
18 than cancer incidence.

19 Q. And is it your view that cancer
20 deaths is a sufficient proxy for the
21 incidence of cancer?

22 A. Well, of course, cancer deaths
23 will be substantially correlated with cancer
24 incidence, and I included cancer deaths on
25 the premise that opioids are indicated for

1 end-of-life cancer treatment.

2 Q. Do you understand that opioids
3 may be indicated for cancer pain even if it's
4 not at end of life?

5 A. I understand that according to
6 clinical experts there are certain cases
7 where opioids may be indicated for cancer
8 pain.

9 Q. Do you agree that cancer
10 incidence may increase the amount of MMEs
11 shipped to a county?

12 A. Actually, I was -- it is
13 possible that cancer incidence does correlate
14 with the number of MMEs per county, but very
15 unlikely to me that adding cancer incidence
16 to a model that has cancer deaths would
17 contribute anything to explaining the
18 variation in county-level shipments.

19 Q. You did not include a variable
20 reflecting the number of individuals eligible
21 for a pharmacy benefit through their insurer
22 in a county?

23 A. I did not include a variable
24 reflecting the number of individuals eligible
25 for a pharmacy benefit in the county. Again,

1 I believe that in particular, the percent
2 uninsured will summarize the accessibility to
3 coverage and that adding the pharmacy benefit
4 piece will contribute very little given the
5 more than 90%, I think more than 95% of
6 people who have insurance also have a
7 pharmacy benefit.

8 Q. But as we spoke about
9 yesterday, the parameters of insurance
10 coverage including a pharmacy benefit can
11 influence the prescription and utilization of
12 opioids?

13 MR. SOBOL: Objection.

14 A. While it may be true for an
15 individual patient, you can see that my
16 percent uninsured variable, is not
17 statistically significant in this model, so
18 again, accounting already for the population
19 characteristics, the socioeconomic
20 characteristics of the county, percent
21 uninsured, which is clearly the first order
22 measure, does not add any -- anything to this
23 model in terms of explanatory value, and so
24 getting even more granular than that I
25 believe would not change the model.

1 BY MR. ROTH:

2 Q. You did not include a variable
3 reflecting the existence or number of pill
4 mills in a county.

5 A. I did not include a variable
6 reflecting the existence of pill mills. I
7 think to control for that does not make a lot
8 of sense to me, given that I believe it's --
9 that those may have been caused by the
10 alleged misconduct.

11 Moreover, as with other
12 variables not included of that supply side
13 nature, I believe the socioeconomic variables
14 are likely to explain a great deal of the
15 variation in the existence of pill mills.

16 Q. So is it your position that the
17 manufacturers' promotion created the
18 diversion of prescription opioids through
19 pill mills?

20 MR. SOBOL: Objection to the
21 form.

22 A. I have not offered that
23 opinion, but you asked me as to whether I
24 would consider -- well, you asked me whether
25 I included pill mills and my first reaction

1 is that I would not consider that to be an
2 appropriate variable to control for because
3 it would essentially say, oh, yeah, this
4 is -- this is expected. These pill mills are
5 expected, and only changes in opioid
6 prescribing outside of the pill mills would
7 be subject to recovery.

8 As I understand the
9 allegations, I would be very surprised if
10 that would be an appropriate assumption.

11 Q. So in your view, you think the
12 manufacturers should be responsible for the
13 illegal prescription of opioids through pill
14 mills?

15 MR. SOBOL: Objection.

16 A. I think you've gone a little
17 too far, but in my view, I wouldn't just
18 include such a variable like that without
19 better understanding exactly what plaintiffs
20 intend to prove.

21 BY MR. ROTH:

22 Q. Do you agree that the existence
23 of pill mills can increase the amount of MMEs
24 shipped and utilized in a county?

25 A. I believe that that is the

1 concern with pill mills. Perhaps by their
2 derogatory name, that is my presumption, that
3 they do, in fact, make opioids more available
4 than they otherwise would be.

5 Q. And more broadly, you did not
6 include any variable reflecting the existence
7 or volume of illegal prescribing in the
8 county?

9 MR. SOBOL: Objection.

10 A. I do not have a variable on
11 illegal prescribing in the county, no, I do
12 not. And I would have the same concern about
13 the extent to which that is to be considered
14 an independent factor.

15 BY MR. ROTH:

16 Q. You don't have a variable for
17 formulary placement of opioids in the
18 indirect model?

19 A. Did we not cover that?

20 Q. We covered pharmacy benefits.

21 A. Oh, I'm sorry. I have not
22 included a formulary measure and I'm not
23 sure -- entirely sure what you mean by that.
24 But I would say again, given that the percent
25 uninsured, which is the first order measure

1 of coverage and accessibility is not
2 statistically significant in my model, I
3 would not anticipate a more nuanced measure
4 of the nature of coverage to affect my
5 results.

6 Q. You did not include a variable
7 to account for the introduction of Medicare
8 Part D in your model?

9 A. Well, the indirect model is a
10 cross-sectional model of 1997, which is a
11 number of years in advance of Medicare
12 Part D. And again, given that the percent
13 uninsured seems to have no relationship in
14 the cross-section to opioid use, then
15 Medicare Part D would not play a role in the
16 model.

17 Q. You did not include a variable
18 for promotion by non-defendants in the model,
19 correct?

20 A. My time trend, as I describe
21 it, was intended to proxy for that, but --

22 Q. Right. So you have a separate
23 secular trend.

24 A. Yes.

25 Q. You don't have it as a separate

1 variable.

2 A. That's right, it's not a
3 separate variable, and that's why I include
4 the time trend.

5 Q. Are you aware that
6 non-defendant promotion accounts for
7 approximately 32% of the promotional contacts
8 in the IPS data, on a national level?

9 A. I'm hoping somewhere that's in
10 my report. I'm willing to believe you. We
11 certainly calculated that figure.

12 Q. Okay.

13 A. I just don't want to go back to
14 the dreaded Table C.

15 Q. Yeah, we may later, but we'll
16 stop for now on there.

17 A. Okay.

18 Q. All of the variables we just
19 discussed that you excluded from your
20 indirect model are likewise excluded from
21 your direct model?

22 MR. SOBOL: Objection.

23 A. The variables that we discussed
24 do not appear in my direct model, and the
25 direct model as an aggregate time series

1 model has different considerations in terms
2 of what variables are appropriate to include.

3 BY MR. ROTH:

4 Q. And because you did not include
5 any of the excluded variables just discussed
6 in your indirect model, you did not expressly
7 measure the impact of those variables on the
8 sales of opioids in Cuyahoga or Summit
9 Counties?

10 MR. SOBOL: Objection, asked
11 and answered.

12 A. While that is tautologically
13 true, it is the case, as I started when we
14 were talking about omitted variable bias,
15 that it's always possible to add more
16 variable to a model, and that is not -- that
17 is not good without limit.

18 BY MR. ROTH:

19 Q. Well, I understand you don't
20 want to add variables forever, but at what
21 point does the number of variables in an
22 indirect regression render the regression
23 unstable?

24 A. Well, it would depend on the
25 correlation among those variables.

1 (Whereupon, Deposition Exhibit
2 Rosenthal-23, Case and Deaton
3 Publication, was marked for
4 identification.)

5 BY MR. ROTH:

6 Q. Okay. Let me mark as
7 Exhibit 23 an article by Case and Deaton
8 entitled Mortality and Morbidity in the 21st
9 Century.

10 MR. ROTH: We're finding one
11 for you.

12 (Comments off the stenographic
13 record.)

14 MR. SOBOL: Sounds like a
15 fairly narrow topic for a paper.

16 MR. ROTH: Why don't we take a
17 quick break. We'll look for the copy.

18 THE WITNESS: Okay.

19 THE VIDEOGRAPHER: The time is
20 10:16 a.m., we're now off the record.

21 (Discussion off the record.)

22 THE VIDEOGRAPHER: The time is
23 10:16 a.m. We're back on the record.

24 BY MR. ROTH:

25 Q. That's pretty efficient.

1 A. That was very efficient.

2 Q. So do you have the Case and
3 Deaton article in front of you?

4 A. I do.

5 Q. And if you look at page 444.

6 A. These economics articles are
7 very long.

8 Q. I think you cite this article
9 in your report, do you not?

10 A. I think I do, yes.

11 Q. Okay. Page 444, there's a
12 comment from a friend.

13 Do you see that?

14 A. I do.

15 Q. And that's Professor Cutler,
16 who is a co-expert with you and your
17 colleague at Harvard?

18 A. Yes, that's correct.

19 Q. And so if you look at his
20 comments on the next page, 445, starting in
21 the middle of the page where he's talking
22 about the article, he says: Their overall
23 suggestion is very much in the tradition of
24 ?mile Durkheim: People despair when their
25 material and social circumstances are below

1 what they had expected. This despair leads
2 people to act in ways that significantly harm
3 their health. This may have a direct impact
4 on death through suicide or an indirect
5 impact through heavy drinking, smoking, drug
6 abuse, or not taking preventative medications
7 for conditions such as heart disease. At
8 root is economic and social breakdown. This
9 explanation is certainly correct.

10 Do you see that?

11 A. I do.

12 Q. And what variables in your
13 indirect model address the despair points
14 that Professor Cutler is talking about?

15 A. Professor Cutler and Case and
16 Deaton, they're talking about mortality.
17 They're not talking about the use of opioids.

18 Q. Well, except that he says that
19 despair can lead people to abuse drugs.

20 A. Yes, but it's quite a bit
21 different. So they're talking about the
22 mortality effects, which go beyond the use of
23 drugs.

24 As we've discussed somewhat
25 over the last day and a half, the use of

1 opioids in and of itself doesn't lead
2 everyone to die from an overdose. There's
3 tolerance and addiction, and all along that
4 chain, there are different factors that may
5 contribute to who actually dies of an
6 overdose. So this -- this paper is really
7 trying to get at the mortality results.

8 And moreover, the socioeconomic
9 variables included in my model have much to
10 do with this idea of the expected material
11 and social circumstances, has to do with
12 employment, whether people are in the labor
13 force. All of those socioeconomic variables
14 capture those factors.

15 Q. But you don't include any
16 variable, for example, on the incidence of
17 depression in the counties?

18 MR. SOBOL: Objection.

19 A. I do not include a variable on
20 the incidence of depression. I have no
21 reason to believe that that would predict
22 opioid use.

23 BY MR. ROTH:

24 Q. You don't include any variable
25 on the incidence of alcoholism in the

1 counties?

2 A. I do not include a variable on
3 the incidence of alcoholism, nor would I
4 expect it to predict opioid use.

5 Q. You don't think that alcohol
6 use is correlated with opioid use?

7 A. Whether individuals who are
8 likely to use opioids have some of the same
9 personal characteristics as those
10 individuals, that may well be true. But my
11 demographic and socioeconomic factors are
12 also capturing those underlying issues that
13 may be, according to this notion, that the
14 economic status of people is really what's
15 driving the addiction tendencies, and those
16 are the variables that I include in my model.

17 Q. And similarly, you don't
18 include any variable in your -- either of
19 your regression models related to drug abuse
20 in the counties?

21 MR. SOBOL: Objection.

22 A. If you think about my indirect
23 model, predicting shipments to have drug
24 abuse on the right-hand side would make very
25 little sense if the shipments caused the drug

1 abuse.

2 BY MR. ROTH:

3 Q. Well, there are drugs other
4 than opioids in the world that are abused,
5 right?

6 A. That may be true. Again, as a
7 broader matter, the demographic and
8 socioeconomic variables that I do capture in
9 my model are essentially the way Case and
10 Deaton look at this as well as these being
11 the predictors of ultimately what contributes
12 to mortality.

13 MR. ROTH: Okay. Why don't we
14 take another quick break.

15 THE WITNESS: Okay.

16 THE VIDEOGRAPHER: The time is
17 10:21 a.m. We're now off the record.

18 (Recess taken, 10:21 a.m. to
19 10:34 a.m.)

20 THE VIDEOGRAPHER: The time is
21 10:35 a.m., and we're back on the
22 record.

23 BY MR. ROTH:

24 Q. So sticking with your indirect
25 model.

1 A. Okay.

2 Q. So we talked about a couple of
3 times now how because the ARCOS data is at
4 the molecule level, you couldn't back out the
5 Schedule III opioids; is that right?

6 A. That's right. In those two
7 molecules that have a mix, right?

8 Q. And your report says you don't
9 believe this impacts the model because it
10 affects only less than 2% of shipments, and
11 then you further clarified actually that it's
12 less than 1%.

13 Did I hear that right?

14 A. Right. So it's less than 2%
15 of shipments in those molecules -- I'm
16 actually trying to look for the text. Do you
17 have that paragraph?

18 Q. It's paragraph 83.

19 A. Okay, great. Thank you. Less
20 than 2% of the shipments in those molecules
21 that have a mix of Schedule II and Schedule
22 III, and that's hydrocodone and codeine, I
23 believe, are the two molecules that are
24 relevant.

25 Q. And did you test how removing

1 all of the Schedule III opioids from the
2 ARCOS data would impact your model?

3 A. I don't believe so, no. I
4 mean, I assume what you mean is overremoving
5 since in the ARCOS data I couldn't
6 distinguish, but removing the molecules that
7 have any Schedule III, is that what you're
8 asking?

9 Q. Right?

10 A. Yeah. That, I did not test.

11 Q. And we established you used
12 1997 as your baseline, right?

13 A. That's correct.

14 Q. So I assume your assumption is
15 that the relationship between demographic,
16 economic and healthcare variables for 1997
17 holds for all future years?

18 A. That is the basic assumption of
19 the indirect model in general, is that the
20 cross-sectional relationships are stable, and
21 just the variation in those variables changes
22 over time.

23 Q. Do you know what the
24 rescheduled Schedule III opioids were as a
25 percentage of sales in 1997?

1 A. When you say rescheduled,
2 you're just talking about hydrocodone?

3 Q. Well, let me reask the
4 question.

5 A. Sure.

6 Q. Do you know what the percentage
7 of sales Schedule III opioids were in 1997?

8 A. If -- I'm sorry. I don't know
9 that I understand the question because I know
10 the answer to a version of that question,
11 which I think is the relevant one.

12 The percentage of the included
13 molecules that are Schedule III that I can't
14 pull out is 2?%.

15 Q. In 1997?

16 A. In 1997, yes.

17 Q. Okay. What about the rest of
18 the Schedule III, that later became Schedule
19 II on the rescheduling, what was their
20 percentage of sales in 1997?

21 A. So now we're talking about
22 hydrocodone rescheduling?

23 Q. Correct.

24 A. I have not assessed that.

25 Again, as we talked about yesterday, I've

1 been asked to assume that hydrocodone should
2 be included in my measure of impact for the
3 whole period.

4 Q. And how would it affect the
5 results of your indirect regression if the
6 percentage of Schedule III molecules in the
7 sales data changes over time?

8 A. I don't think it would affect
9 the results. I mean, I think, again, to the
10 extent that it has an effect, it's a -- it's
11 a level effect.

12 For such a small quantum that's
13 in my analysis, the Schedule III drugs, it's
14 just next to impossible that it has any
15 effect on the coefficients. It overstates
16 the set of molecules, the number of MMEs, and
17 that effect I know also is small. It's less
18 than 1% of MMEs.

19 In terms of the rescheduling of
20 hydrocodone, I haven't quantified that, so as
21 I sit here, I can't tell you. Again, I
22 believe if it has an effect and if it's
23 deemed, for example, that hydrocodone should
24 only be included when it was Schedule II and
25 not when it was Schedule III, then those MMEs

1 would just be backed out of the levels.

2 Q. Okay. If we look back at
3 Table 5 on page 61.

4 A. Yes.

5 Q. How does the volume of MMEs
6 that you derive from your indirect regression
7 compare to the volume of MMEs you derived in
8 your direct regression?

9 A. The total volume, because I'm
10 looking at the large counties here, they're
11 about two-thirds of the national total, so it
12 essentially should be about two-thirds.
13 Again, these are annual numbers and I use
14 monthly numbers as inputs into my direct
15 analysis.

16 Q. And when you say you're looking
17 at the large counties, can you explain that?

18 A. Sure. The ARCOS data that I
19 used for the indirect model is the large
20 county sample, so these are counties with
21 populations of 100,000 or more.

22 Q. So it's not limited to Cuyahoga
23 and Summit specifically?

24 A. That's correct.

25 Q. How do the peaks in the MMEs

1 compare between the indirect regression and
2 the direct regression?

3 A. Do you mean in the but-for or
4 in the actual?

5 Q. Well, in the -- looking just --
6 I'll be more clear.

7 In looking at Table 5, it looks
8 like the highest volume of total MMEs is
9 actually in 2011.

10 Do you see that?

11 A. Yes, I mean, 2010 and 2011 are
12 very similar, but it is slightly higher.

13 Q. Right. And I'm just trying to
14 square that with your direct regression which
15 found that there was this era turning point
16 in 2010 that resulted in a decline after
17 that.

18 A. Well, let's have a look at when
19 the peak MMEs are as opposed to when I
20 estimate the erosion begins to happen.

21 So I'm just looking at
22 Figure 2. So the absolute peak is in 2011,
23 but if you look at 2010, again, it's just a
24 bit below 2011. There's sort of a flat spot
25 at the top of the curve there, so...

1 Q. Okay. So in both regressions,
2 the peak is actually in 2011?

3 A. Yeah, I think the peak is in
4 2011.

5 Q. And you agree, based on the
6 results of your direct regression, that
7 defendants' promotion for opioids had less
8 effect after 2010?

9 A. According to my model, the
10 incremental effect of promotion began
11 declining in late 2010, yes.

12 Q. Is it the case that the
13 majority of the conduct influencing the
14 but-for number in your direct model occurred
15 before 2010?

16 A. I'm just trying to think about
17 what's the right way to answer that question.
18 You're talking -- we're talking about the
19 direct model now?

20 Q. Correct. Well, here's my sort
21 of question. So you've got conduct over
22 time, right?

23 A. Yes.

24 Q. Starting in '95, right? And
25 we've got a growing stock of promotion.

1 We've been around all those issues.

2 So is it fair to say that given
3 the parameters of your direct regression,
4 your but-for model is being more heavily
5 influenced by the 1995 to 2009 details than
6 later details?

7 A. It is true based on Model B
8 that those earlier detailing will -- I mean,
9 it has a longer time to compound effectively.

10 What the level of detailing is,
11 as you know, it's sort of up and down, so
12 it's not a strictly monotonic thing, given
13 that there were periods where the level of
14 detailing was lower.

15 But in general, the model
16 suggests that earlier detailing, because it
17 has longer time to contribute to sales, for a
18 given unit will have a bigger effect on the
19 total.

20 Q. And you have not run any
21 regression model that attempts to show the
22 effect of defendants' promotion beginning in
23 2009 on prescriptions of opioids after that
24 time?

25 A. Well, my model incorporates the

1 entire time period. I haven't separately run
2 a model from 2009 forward. I don't think it
3 would be appropriate to run a separate model.
4 One could use my model to run a but-for
5 scenario in the post-estimation sense.

6 Q. But the issue there, though, is
7 that you still have all these details
8 from '95 to 2009 in your model, which have
9 continuing -- continuing impact after 2009?

10 A. Well, just to be clear, I'm not
11 sure what your hypothetical is, but if I
12 wanted to know for some reason only what
13 impact detailing from 2009 or any other year
14 was from the present, I'd use the same model,
15 but I would say that actual and but-for
16 promotion are equal up until 2009, so not
17 attributing impact to those earlier details.

18 And then from that point on,
19 then I would reduce the promotional stock by
20 the amount of detailing that happened after
21 that time, so that would be the right way, if
22 for some reason one wanted to look at a
23 shorter time period.

24 Q. And that's not an analysis
25 you've done so far?

1 A. It's not, although I mention in
2 Table 3 that I could limit my analysis to
3 different time periods like that.

4 Q. Okay. Table 5 is measuring
5 annual estimates based on your indirect
6 method on an aggregate basis, correct?

7 A. As per my assignment, I'm
8 looking at aggregate impact in this model as
9 I do in the direct model.

10 Q. And it does not measure the
11 impact of any specific manufacturer's
12 promotion, the indirect model?

13 A. Again, I have been asked to
14 calculate the aggregate impact, and because
15 there are spillover effects across
16 manufacturers, I believe here, as I did in
17 the direct model, that it is appropriate to
18 look not one defendant at a time, but to look
19 overall at the underlying issues.

20 Q. You don't have any Table 3 or
21 related methodology for your indirect
22 regression, correct?

23 A. I don't have a Table 3 for the
24 indirect method because, of course, it's
25 indirect, and Table 3, as we have talked

1 about at length, generates a different set of
2 but-for assumptions by treating promotion
3 differently for the subset of defendants.

4 Q. And you don't have any
5 IQVIA/IPS-type data for the indirect
6 regression that you could use to generate an
7 allocation the way you have for the direct
8 regression?

9 A. Again, here, the promotion is
10 not directly measured by nature, so that
11 doesn't map to defendants in the way it did
12 in the direct model. In -- and so I have not
13 thought about -- again, because it was not
14 part of my assignment, I have not thought
15 about allocating this to defendants. I think
16 the logical way to do so might be based on
17 MMEs.

18 Q. But you can't actually allocate
19 by MMEs in your indirect model either because
20 the ARCOS data is at a molecular level, not
21 at an NDC level?

22 A. While that is true, I have the
23 IQVIA data for the same years that would
24 allow me to say within a molecule what share
25 is Purdue, et cetera.

1 Q. So you'd have to use a
2 different dataset mapped onto your indirect
3 regression if you were to try to allocate the
4 indirect regression across and between
5 defendants?

6 A. If such allocation were
7 necessary for whatever reason, I think that
8 would be the best way to do it.

9 Q. But as we sit here today, you
10 have not done that work and you have no
11 opinion as to what that allocation would be
12 in your indirect regression?

13 A. I have not offered an opinion
14 on that matter as you can see in my report.

15 Q. Does your indirect regression
16 exclude opioid shipments by the
17 non-defendants?

18 A. No, the indirect method is the
19 aggregate market, so it includes
20 non-defendants, and hence, the reason to
21 include that secular trend.

22 Q. So when we look at these excess
23 shares, that's not just for defendants'
24 promotion, but it's for all promotion?

25 A. These excess shares are

1 analogous to the excess shares that are in
2 Table 2, which is they are the excess share
3 of opioid prescribing overall that is
4 associated with the misconduct, and again,
5 that's the relevant parameter that I need to
6 pass on to Professor Cutler.

7 Q. And Professor Cutler didn't
8 actually use your indirect regression in the
9 body of his report; is that correct?

10 A. I think in the body of his
11 report he uses the direct, and then he
12 replicates with the indirect in the -- one of
13 his attachments.

14 Q. And did you have any
15 conversations with Professor Cutler about
16 that decision to use the direct in his main
17 analysis and address the indirect in an
18 attachment?

19 A. No.

20 Q. Do you know whether Professor
21 McGuire uses your indirect regression as an
22 input to his analysis?

23 A. I do not.

24 Q. Did you have any direct
25 conversations with Professor McGuire about

1 your analysis and how it would translate into
2 his analysis?

3 A. Yes, at some point.

4 Q. Okay. And you understand that
5 there's an intermediate step between you and
6 Professor McGuire that is Professor Cutler's
7 analysis?

8 A. Yes. As a general matter, yes,
9 I understand how these fit together.

10 Q. Okay. Let's turn to Section X
11 on page 62.

12 So in Section X, the question
13 you pose in the heading is Does a Theory of
14 Undertreated Pain Explain the Growth in
15 Opiate Prescribing.

16 Do you see that?

17 A. Yes.

18 Q. And you say in paragraph 90:
19 As an alternative to the defendants'
20 marketing as being the explanation for much
21 of the rise in opioid prescribing in the
22 United States, I understand that some have
23 argued an alternative explanation that pain
24 was previously undertreated and that the
25 growth in opioid shipments is due either to

1 the amount of pain in the United States
2 increasing over time, or more likely to the
3 amount of the opioids used to properly treat
4 pain increasing over time.

5 Do you see that?

6 A. I do.

7 Q. And then you say in
8 paragraph 91: To test this hypothesis, I
9 note there is empirical research on the
10 prevalence of uncontrolled pain among cancer
11 patients and other patient groups that could
12 help us understand how much of the growth in
13 opioid shipments could, as a theoretical
14 matter, even possibly be attributed to using
15 more opioids to treat pain consistent with
16 medical evidence.

17 Do you see that?

18 A. I do.

19 Q. Then you've got a footnote that
20 cites to a few medical articles by
21 Dr. Portenoy, Dr. Cleeland, Dr. Donovan, a
22 Marks and Sachar article, and then I won't
23 even attempt to say the name of the last
24 author.

25 Do you see that?

1 A. I do.

2 Q. And is there any other
3 empirical research on uncontrolled pain that
4 you reviewed in connection with your report
5 that supports the statement in paragraph 91 I
6 just read?

7 A. Obviously these are the
8 articles that I rely on. My point here is
9 simply to say that prior to the period of the
10 alleged misconduct, people were writing about
11 the concerns about uncontrolled pain for
12 these particular areas, and I'm simply -- I'm
13 not trying to be exhaustive about it; I'm
14 just simply showing that there is
15 documentation in the academic literature of
16 these concerns.

17 Q. And academic literature, by
18 that you're talking primarily about medical
19 articles, correct?

20 A. Well, undertreated pain
21 presumably is a medical issue.

22 Q. Right. And then in
23 paragraph 91 you say, after the sentence I
24 read: In this section I use epidemiologic
25 data and a simple simulation approach to

1 approximate the portion of the increased
2 prescribing caused by the allegedly unlawful
3 promotion could possibly be associated with
4 using opioids to address ostensibly
5 undertreated pain.

6 A. It seems like I'm missing a
7 word there.

8 Q. Yeah, I think there's a typo,
9 but I read that correctly?

10 A. Yes, you did.

11 Q. Okay. So in paragraph 91 you
12 describe the simple simulation approach,
13 which in paragraph 92 you describe as a
14 thought experiment.

15 Do you see that?

16 A. Yes.

17 Q. How would the economic
18 literature describe the type of analysis
19 you're conducting in paragraph 10 of your --
20 Section X of your report?

21 A. Generally, simulation is the
22 word that economists would use to describe
23 it.

24 Q. And is simulation a
25 peer-reviewed methodology?

1 A. Sure.

2 Q. And what papers would I read to
3 describe how to conduct a proper simulation
4 in economics?

5 MR. SOBOL: This one.

6 A. Simulations are used in a whole
7 variety of settings. In general, the
8 cost-effectiveness literature uses simulation
9 as a primary methodology.

10 BY MR. ROTH:

11 Q. Okay. As you sit here now, can
12 you think of a specific economics
13 peer-reviewed paper that uses a simulation
14 approach akin to the approach you take in
15 Section X of your expert report?

16 A. As I sit here, I couldn't come
17 up with a citation for you. My -- my recall
18 for article names is not that good, but this
19 is -- this is a pretty common approach,
20 particularly when it comes to looking at the
21 effects of policies, proposed policies.

22 Q. Have you published any research
23 yourself that utilizes the same type of
24 simulation approach that you outlined in
25 Section X of your expert report?

1 A. I have a recent paper that
2 simulates a policy proposal that would, in
3 effect, tax companies that raise their
4 prescription drug prices above either the CPI
5 or some other particular threshold, so that
6 uses a simulation approach.

7 Q. And if we look at Attachment A,
8 which is your CV, can you show me which paper
9 you're talking about?

10 A. Yeah, let me just see. It was
11 just published this year, but I think it
12 should be on there. Sorry, that's my other
13 documents.

14 It's article 119.

15 Q. Article 119. Generic
16 prescription drug price increases, which
17 products will be affected by proposed
18 anti-gouging legislation?

19 A. That's correct.

20 Q. Beyond that article in -- 119
21 that you just identified, can you think of
22 any other peer-reviewed publications you've
23 authored that utilize the same type of
24 approach you outline in Section X of your
25 report?

1 A. There is another one. Let me
2 see if -- I just need to figure out what year
3 it was.

4 Article 34.

5 Q. It's helpful that you number
6 things, by the way.

7 So that's State and Federal
8 approaches to health reform: What works for
9 the working poor?

10 A. That's correct.

11 Q. Okay. Anything beyond those
12 two?

13 A. I think that -- well, actually,
14 I mention cost-effective analysis, and the
15 article 115 is a cost-effectiveness analysis
16 that uses a microsimulation model.

17 Q. Cost-effectiveness of Financial
18 Incentives for Patients and Physicians to
19 Manage Low-Density Lipoprotein Cholesterol
20 Levels?

21 A. That's correct.

22 Q. Okay. So now we have three.
23 Any others?

24 A. As far as I know, those are the
25 relevant articles on my CV. Again, a

1 simulation is commonly used as either a whole
2 analysis or as part of an analysis.

3 Sometimes researchers will take parameters
4 that they estimate and then use them to
5 simulate a policy change.

6 Q. And you've said a couple of
7 times now, it's used to simulate a policy
8 change.

9 Can you explain what you mean
10 by that?

11 A. Well, in the case of the last
12 article that we just talked about that we
13 undertook a randomized control trial of
14 financial incentives for doctors and patients
15 to control cholesterol better, and we took
16 what we learned in that randomized control
17 trial and said what would happen basically if
18 employers were to adopt this widely or if
19 health insurance companies were to adopt this
20 widely, what would happen to cholesterol
21 control and downstream healthcare
22 expenditures that would result.

23 Q. And to do that, you used a
24 simulation similar to the one you used in
25 Section X of your report?

1 A. Yes, it's based on the same
2 premise. We have some epidemiologic data and
3 then some information about the relevant
4 behaviors, and in this case, the treatment
5 patterns for the patients.

6 Q. And you call this analysis a
7 simulation study or is there some other term
8 I should be using?

9 A. I call it a simulation, and as
10 you can see, I then call it a thought
11 experiment.

12 Q. Yeah. And it's simple
13 simulation and a thought experiment, so I
14 wasn't sure which is best. We may use both
15 interchangeably, if that's okay.

16 A. Sure.

17 Q. What is the appropriate
18 methodology in economics for conducting a
19 simulation study such as the one that you
20 have in paragraph 10 of your report?

21 A. Well, again, as I mentioned, a
22 simulation generally involves some relevant
23 population and then some behavioral
24 parameters. And, I mean, the context will
25 vary.

1 In other contexts, we're
2 looking at patients and their health
3 behaviors. Simulations are frequently done
4 around tax policy, so the relevant behaviors
5 have to do with labor supply, for example.

6 And I do call this a simple
7 simulation here because the only parameters
8 I'm looking at are treatment patterns.

9 Q. If I wanted to find some
10 peer-reviewed treatise or article that told
11 me what the appropriate methodology is for a
12 simple simulation such as the one you conduct
13 in Section X of your report, where would I
14 look?

15 A. I am not sure that there would
16 be a single treatise. I think to the extent
17 that there are methodological frameworks, I
18 think they're likely context specific.

19 Q. So to figure out what the
20 appropriate generally accepted economic
21 methodology is for a simulation, I would have
22 to review a bunch of articles that run
23 simulations and determine the best approach
24 myself?

25 A. I don't know if there's a

1 single methodological paper that would apply
2 here.

3 Q. Okay. So back to
4 paragraph 91 --

5 A. Okay.

6 Q. -- you say at the end of the
7 paragraph: In this section, I use
8 epidemiological data and a simple simulation
9 approach.

10 We talked about that.

11 And then the rest of the
12 sentence says: To approximate the portion of
13 the increased prescribing caused by the
14 allegedly unlawful promotion -- I think you
15 meant "that could possibly be associated."

16 A. Yes.

17 Q. Okay. So when you say
18 promotion that could possibly be associated
19 with using opioids, as we discussed, you're
20 not a medical doctor, right?

21 A. That's correct.

22 Q. So you're relying on
23 plaintiffs' medical experts to tell you what
24 those parameters should be?

25 A. That's correct, in part, yes.

1 Q. You did not make any
2 independent assumptions about the type of
3 patients that could have benefited medically
4 from using opioids?

5 MR. SOBOL: Objection.

6 A. I -- as you can see and will
7 note I talk about, I cite to a number of
8 guidelines and articles, and I rely on
9 plaintiffs' clinical experts to validate my
10 assumptions.

11 BY MR. ROTH:

12 Q. Right, but since you're not a
13 doctor, when you read the guidelines and
14 articles, I take it you took direction from
15 either a doctor or from counsel about what to
16 take out of those articles?

17 MR. SOBOL: Objection.

18 A. Yes, that's correct.

19 BY MR. ROTH:

20 Q. Okay. And you don't have any
21 medical expertise that you would need to make
22 your own independent assumptions about the
23 type of patients that could benefit from
24 using opioids?

25 A. I am not a medical expert.

1 Q. I want to look at paragraph 94.
2 So towards the bottom of that paragraph, you
3 say: Note that because I am not documenting
4 the diagnoses and dosing associated with
5 actual uses of opioids, I am not able to
6 calculate how much of the increased use of
7 opioids during the period in which the
8 alleged misconduct occurred was in fact for
9 clinically appropriate indications, dosages
10 and durations.

11 Did I read that correctly?

12 A. You did.

13 Q. And that's similar to what we
14 discussed yesterday. None of your analyses
15 attempt to parse out whether the excess MMEs
16 you identified were for medically appropriate
17 uses?

18 A. Yes. Again, here I'm trying to
19 calculate this maximum, just say let's just
20 assume that, in fact, some portion of this
21 growth is driven by better treating cancer
22 patients, how much could that possibly be?
23 But I have not been -- I do not have
24 diagnosis codes that would allow me to
25 precisely capture that in the data.

1 Q. Do you know whether data with
2 diagnosis codes for Cuyahoga and Summit
3 County exists that you could use to do an
4 actual analysis?

5 A. I don't know about whether data
6 are available for Cuyahoga and Summit
7 Counties specifically, no.

8 Q. And I read the sentence that I
9 just took from paragraph 94 which you have
10 emphasized a few times with italics as a
11 limitation on your analysis, correct?

12 A. It's a kind of a limitation.
13 It's just a really important clarification
14 because I would not want someone reading my
15 report to interpret the numbers that I've
16 simulated to be actually representative of
17 how prescriptions were -- you know, according
18 to what diagnoses prescriptions were written.

19 So it's not really a
20 limitation. The purpose of my analysis is to
21 do something different, but it should not be
22 interpreted as showing how much was actually
23 used to address cancer pain.

24 Q. Your simulation is a
25 hypothetical analysis based on assumptions

1 you made from plaintiffs' experts'
2 explanation of appropriate uses as opposed to
3 a factual assessment of which prescriptions
4 were medically necessary?

5 A. Yes. I mean, it is based on a
6 set of facts, but it does not compute the
7 share of prescriptions that were actually
8 used for these indications.

9 Q. So let's look at kind of the
10 foundational assumptions you've got in
11 paragraph 92.

12 A. Okay.

13 Q. You say first: I conduct a
14 thought experiment that allows me to
15 calculate, in scare quotes, upper bound of
16 how much of the growth in MMEs could be
17 attributable to more intensive pain
18 management for patient groups that according
19 to plaintiffs' experts could have benefit
20 from treatment of -- with opioids.

21 Do you see that?

22 A. Yes.

23 Q. And then you say: All of the
24 underlying assumptions in this section have
25 been developed in reference to the opinions

1 of the plaintiffs' clinical experts,
2 including Dr. Schumacher and Dr. Parran.

3 Do you see that?

4 A. Yes.

5 Q. Are there any plaintiffs'
6 clinical experts who you rely on that are not
7 Dr. Schumacher and Dr. Parran?

8 A. Not specifically that I rely
9 on, no.

10 Q. Okay. I just was confused,
11 because you say including, but you only named
12 two of them, so I didn't know if there was
13 someone else that's missing here.

14 A. I understand that there are
15 other clinical experts. These are the
16 clinical experts that I rely on.

17 Q. Did you review or rely on
18 Dr. Ballantyne's report?

19 A. I did not, no.

20 Q. Are you aware that plaintiffs
21 have withdrawn Dr. Parran's expert report?

22 A. I was not aware of that, no.

23 Q. Do you know which of the
24 assumptions you made based on Dr. Parran's
25 report in this section of yours?

1 A. I don't believe any of the
2 assumptions were solely based on Dr. Parran.

3 MR. ROTH: And so the record is
4 clear for the reporter, we're actually
5 talking about Parran, P-A-R-R-A-N, who
6 is actually different than Perri,
7 P-E-R-R-I. And Schumacher is
8 S-C-H-U-M-A-C-H-E-R.

9 BY MR. ROTH:

10 Q. Okay. So based on the opinions
11 of Dr. Schumacher and Dr. Parran, you next
12 set forth the assumptions you make about what
13 could possibly have been an appropriate
14 medical use in paragraph 92?

15 MR. SOBOL: Objection.

16 A. Yes, I put forth those three
17 categories of conditions that I understand
18 have clear benefit from opioids.

19 BY MR. ROTH:

20 Q. Okay. So the first category is
21 short-term treatment of severe acute pain,
22 e.g., trauma or postsurgical pain,
23 end-of-life pain/hospice care and cancer pain
24 from active malignant disease.

25 A. That's right.

1 Q. The second category you list
2 based on Dr. Parran and Dr. Schumacher is
3 actually sort of a noncategory, right?

4 A. Yes.

5 Q. Which --

6 A. Again, I'm sorry to interrupt
7 you. Please finish.

8 Q. What you say in (ii) is:
9 Chronic opioid therapy is not recommended for
10 most common chronic pain conditions, defined
11 as moderate to severe pain lasting beyond 60
12 to 90 days, including low back pain,
13 centralized pain such as fibromyalgia and
14 headache pain.

15 Do you see that?

16 A. I do.

17 Q. And we'll talk about this in a
18 minute, but you actually exclude that from
19 your thought experiment?

20 A. That's correct.

21 Q. And then the third category
22 which is included is less common chronic pain
23 conditions such as pain from advanced
24 multiple sclerosis, sickle cell disease, pain
25 following spinal cord injury and paraplegia

1 or post-herpetic neuralgia, which comprise a
2 small percentage of chronic pain patients and
3 for which opioids may be considered a
4 third-line therapy?

5 Do you see that?

6 A. I do.

7 Q. And actually, really, the only
8 ones you include in your thought experiment
9 are Romanette (i), which are trauma or
10 postsurgical pain and cancer pain?

11 A. Yes, just -- I was going to
12 just clarify. In this section in
13 paragraph 92, I'm summarizing what I
14 understand the opinions of the clinical
15 experts have put forward in terms of
16 appropriate uses broadly, and you're correct
17 that when I go to implement my analysis, I'm
18 focusing really on section (i), and I try to
19 explain why.

20 Q. Okay. And we'll get there.

21 A. Yeah.

22 Q. So when you read plaintiffs'
23 medical experts' reports, what you gleaned
24 from those reports was that the only
25 conditions they believed opioids are

1 indicated properly to treat are those
2 conditions listed in paragraph 92?

3 MR. SOBOL: Objection.

4 A. When I read those reports, I
5 gleaned everything that I said in that -- in
6 that extremely long sentence, which is a
7 little more nuanced than I think what you
8 just said.

9 BY MR. ROTH:

10 Q. Do you know whether plaintiffs'
11 medical experts' positions regarding the
12 proper indication of opioids today were the
13 prevailing medical guidelines for use of
14 opioids from 1995 to the present?

15 MR. SOBOL: Objection.

16 A. I am probably not the person to
17 best characterize that, but I have looked at
18 some of those guidelines, and I also have
19 read the complaint, and I know that
20 plaintiffs intend to prove that part of the
21 misconduct influenced guidelines that were
22 broader than these opinions.

23 So I believe by extension it
24 must be true that there are guidelines from
25 that period that suggest that it is safe to

1 use opioids for things like chronic pain.

2 BY MR. ROTH:

3 Q. And you also understand that
4 medical guidelines are not static, correct?

5 A. I understand that medical
6 guidelines are not static.

7 Q. I mean, as a healthcare
8 economist, I'm sure you've studied lots of
9 drugs where indications and warnings and
10 appropriate uses change over time?

11 A. Well, more specifically, I know
12 in this case that there were updated
13 guidelines issued.

14 Q. But in your thought experiment,
15 you're imposing plaintiffs' experts' 2019
16 framework on opioid use from the entire
17 period from 1995 to the present?

18 A. I think you mistake the purpose
19 of my thought experiment. It is not to say
20 what would happen if we imposed 2019 beliefs
21 by these clinical experts, but rather to say
22 in a world in which there was no misconduct,
23 to what extent might the appropriate -- sort
24 of appropriate efforts to address
25 undertreated pain have led to similar

1 patterns.

2 Q. So if I understand you then,
3 your simulation is predicated on plaintiffs
4 proving that the existing medical guidelines
5 between 1995 and today were wrong as a result
6 of defendants' misconduct?

7 A. Well, I think that you're
8 giving a legal interpretation to my analysis
9 that I'm not really in a good position to
10 judge.

11 What -- the purpose of my
12 analysis is to examine whether there might
13 have been legitimate clinical drivers of the
14 increase in opioids that could have explained
15 a similar pattern of growth.

16 Again, as I understand it,
17 defendants in related matters have said, you
18 know, physicians began using opioids more
19 heavily in the 1990s because of the
20 recognition that pain was undertreated, so
21 I'm simply examining that premise.

22 Q. But if your premise is to try
23 to understand whether there were legitimate
24 clinical drivers, why would you not use the
25 clinical standards in existence at the time

1 of prescription?

2 MR. SOBOL: Objection, asked
3 and answered.

4 A. Those clinical standards are
5 influenced by the misconduct.

6 BY MR. ROTH:

7 Q. So that goes back to my
8 question.

9 An underlying assumption of
10 Section X, your simulation analysis, is that
11 plaintiffs can prove that defendants'
12 misconduct influenced the extant clinical
13 standards from 1995 until the present?

14 MR. SOBOL: Objection, asked
15 and answered.

16 A. Again, I think that you're --
17 you're putting a sort of liability
18 interpretation on this that -- that -- this
19 is not a but-for analysis. You sound like
20 you're describing it as a but-for analysis.

21 It's a thought experiment that
22 says what if we use opioids to perfectly
23 treat the patients that we know can be safely
24 and effectively treated, what would that look
25 like in comparison to the growth that we

1 actually saw.

2 BY MR. ROTH:

3 Q. It's a thought experiment that
4 says if the plaintiffs' experts are right
5 about what opioids can be used for, then this
6 shows how prescriptions compare to what they
7 say opioids should be used for?

8 MR. SOBOL: Objection.

9 A. The thought experiment does
10 depend on the assumptions about which groups
11 could be appropriately treated. That is
12 correct.

13 BY MR. ROTH:

14 Q. Put another way, your thought
15 experiment does not measure opioid usage
16 against the existing clinical standards in
17 place at any point in time?

18 MR. SOBOL: Objection.

19 A. The thought experiment measures
20 the level of opioid use that would have
21 occurred -- sort of the highest level of
22 opioid use that would have occurred according
23 to what I believe plaintiffs' experts intend
24 to prove is appropriate.

25 It is not based on any

1 individual set of guidelines. As I
2 mentioned, I am relying on clinical experts'
3 opinions in order to identify these groups,
4 and so it's not based on a set of guidelines.

5 The treatments -- the treatment
6 patterns do come from some guidelines that
7 I'm sure we will talk about, but again,
8 there -- I do -- I do some sensitivity
9 analysis, but naturally, the specific
10 parameters I choose, including the patient
11 groups, do affect the analysis.

12 And the reason why I call it a
13 thought experiment is this is not intended to
14 say this is -- there's only one version of
15 this, but instead, to say, well, look, I've
16 picked these three important groups, and I've
17 assumed that absolutely everyone gets
18 treated, and -- and look how little of the
19 growth in opioids that explains. If you want
20 to add another 50%, it still explains very
21 little.

22 BY MR. ROTH:

23 Q. And what would the basis be for
24 adding 50%? Just rough justice?

25 A. If you thought for example that

1 I was missing a group of patients or that
2 my -- that dosing, in fact, could safely be
3 50% higher or that duration could be 50%
4 higher.

5 Q. I forgot to ask you earlier
6 when we were talking about your methodology.
7 Have you utilized a simulation approach
8 similar to the one in Section X of your
9 report in other expert work that you've done?
10 And feel free to take a drink.

11 A. I'm sorry, now I have the
12 reverse problem.

13 Q. Let me reask the question
14 because the transcript is not clear.

15 Have you utilized a simulation
16 approach like the one in Section X of your
17 report in other expert work that you've done?

18 A. In effect, any but-for analysis
19 is a simulation. I usually call those
20 simulations because they abstract from the
21 actual world by changing some set of facts.
22 Those are simulations.

23 There have also been
24 simulations in my expert work, for example,
25 in the AWP matter, the damages are basically

1 calculated by simulation, assuming that
2 instead of whatever markup was actually
3 charged, that there would have been only a
4 30% markup, for example, on drugs.

5 So simulation is very commonly
6 used as a damage analysis. Although that's
7 not what I'm using it here for.

8 Q. Have you used a simulation
9 outside of damages analysis in other cases as
10 you do in Section X of your report?

11 A. I'm not sure whether I have.

12 Q. So because Section X is based
13 on plaintiffs' medical experts' assumptions
14 about appropriate use of pain, you do not
15 calculate MMEs associated with treatments
16 beyond what they include in your analysis?

17 MR. SOBOL: Objection.

18 A. Oh, I'm sorry. I'm not totally
19 sure what you're talking about.

20 BY MR. ROTH:

21 Q. So we can go through paragraph
22 by paragraph and see exactly what types of
23 pain -- what types of opioid uses you permit
24 based on their opinions.

25 A. Yes.

1 Q. And we'll do that. But my
2 question is a little different.

3 My question is because you
4 limit yourself to what you glean from
5 Dr. Schumacher and Dr. Parran are appropriate
6 uses of opioids, you do not include other
7 uses of opioids that might be appropriate
8 under medical guidelines in your simulation
9 of MMEs?

10 A. I think it's fair to say that I
11 include the three categories of patients in
12 my analysis, and by extension, I do not
13 include others.

14 Q. And looking back at
15 paragraph 92, you took from Dr. Schumacher
16 and Dr. Parran that chronic opioid therapy is
17 not recommended for most common chronic pain
18 indications, correct?

19 A. That's what I understood, yes.

20 Q. You understand that opioids are
21 indicated for and labeled for those uses?

22 MR. SOBOL: Objection.

23 A. I do know that in some cases
24 they are labeled for chronic pain.

25 ///

1 BY MR. ROTH:

2 Q. So your simulation depends not
3 only on showing that the medical standards in
4 place at the time were wrong, but also that
5 the FDA should not have approved opioid use
6 for chronic pain?

7 MR. SOBOL: Objection, in part
8 asked and answered, misstates her
9 prior testimony.

10 Go ahead.

11 A. I would not agree that it
12 depends on that. My analysis conducts this
13 thought experiment on this group for which it
14 is clear that -- to clinical experts, as I
15 understand it, that opioids are appropriately
16 used.

17 For chronic pain patients, I
18 understand that the clinical opinions that
19 are being offered by plaintiff experts are of
20 this mixed form, as I show here, and so I do
21 not include those patients in my analysis.

22 I don't believe that means the
23 analysis has no utility if, in fact, there's
24 some subgroup of patients for whom they are
25 appropriate. But that's, in fact, captured

1 in these opinions, and we'll go on to talk
2 about what the implications are.

3 I think my results can be
4 viewed in the context of the idea that there
5 may be this small group of chronic pain
6 patients who benefit from opioids.

7 BY MR. ROTH:

8 Q. And if you were to include any
9 number of chronic pain patients for whom
10 opioid use is appropriate in your simulation,
11 that would increase the number of potentially
12 appropriate MMEs and thus, decrease the gap
13 between actual MMEs prescribed and your
14 potentially appropriate number?

15 MR. SOBOL: Objection.

16 A. If you were to add to the
17 number of patients and the number of MMEs,
18 that would increase the total, yes.

19 BY MR. ROTH:

20 Q. Have you done any study or
21 analysis as to what number of chronic pain
22 patients might be an appropriate quantum to
23 add to your potentially appropriate group?

24 A. So I don't believe that there's
25 a single number that I've seen when I look at

1 the clinical opinions, as I've summarized
2 them here. They're more qualitative.

3 And when they refer to
4 third-line treatment, I think that is a
5 concept that would require understanding what
6 percentage of chronic pain patients have
7 tried and failed to use other therapies.

8 Q. So we saw yesterday morning,
9 which feels like a long time ago, that
10 Excellus Blue Cross Blue Shield in its
11 guidelines still approves of the use of
12 opioids for pain in some circumstances.

13 A. In its formulary, yes, I think
14 that's right.

15 Q. Okay. And are you aware the
16 CDC guidelines also approve opioid use for
17 chronic pain in some instances?

18 MR. SOBOL: Objection.

19 A. I do believe the CDC
20 guidelines -- and I'm not sure that I've seen
21 the most recent ones, but the CDC guidelines
22 do mention chronic pain as a use for opioids.
23 BY MR. ROTH:

24 Q. And in fact, Dr. Parran himself
25 agrees that chronic pain may be clinically

1 appropriate for some subset of patients?

2 MR. SOBOL: Objection.

3 A. I believe those opinions again
4 which are nuanced here summarize that same
5 conclusion that you've drawn, that for some
6 small group of patients, opioids may be
7 appropriate.

8 BY MR. ROTH:

9 Q. Yeah. And I can mark this, but
10 I don't know if you just remember. I mean, I
11 think he says in his report chronic opioid
12 therapy for persons with chronic pain
13 conditions is at most indicated in less than
14 10% of patients with chronic pain, and likely
15 significantly fewer.

16 Do you recall reading that?

17 A. That sounds familiar.

18 Q. Okay.

19 A. Obviously that's -- less than
20 10% is a hard number to plug into a
21 simulation.

22 Q. It's some nonzero number, and
23 he's saying it's somewhere between zero and
24 ten without really saying what it is, so I
25 would agree with you.

1 But you recall seeing that he
2 didn't say it was totally impermissible?

3 MR. SOBOL: Objection.

4 A. He did not -- and I'll slow
5 down. And again, I reflect that nuance in my
6 description here.

7 BY MR. ROTH:

8 Q. You reflect it in your
9 description, but you don't reflect any number
10 of chronic pain patients in your simulation.

11 A. That's correct, I explicitly
12 exclude them.

13 (Whereupon, Deposition Exhibit
14 Rosenthal-24, CDC Guideline for
15 Prescribing Opioids for Chronic Pain,
16 United States, 2016, was marked for
17 identification.)

18 BY MR. ROTH:

19 Q. All right. I'm going to show
20 you what I'll mark as Exhibit -- no, I don't
21 want this one. Sorry. She's been so good.

22 A. I know. She has a hard job
23 reading your mind.

24 Q. I'm going to mark as Exhibit 24
25 the CDC guidelines for prescribing opioids

1 for chronic pain from 2016. And are these
2 the guidelines you recall reviewing?

3 A. Yes, I have reviewed the 2016
4 guidelines.

5 Q. And are there more recent
6 guidelines than 2016?

7 A. I'm not sure. That's -- I was
8 just allowing for the possibility because I
9 think there are older guidelines.

10 Q. Right. And the older
11 guidelines it's fair to say are likely more
12 generous in terms of what they suggest is
13 appropriate usage for opioids with respect to
14 chronic pain than the more recent guidelines?

15 MR. SOBOL: Objection.

16 A. I don't recall.

17 BY MR. ROTH:

18 Q. Would you not expect that,
19 given the information in medical journals,
20 et cetera, about an increased sensitivity
21 frankly just to addiction issues and opioids?

22 A. I guess it depends on what
23 we're comparing it to. If we had guidelines
24 from 1990 or 1985, I would expect them to be
25 even more cautionary.

1 Q. And have you reviewed the
2 guidelines from 1980 or 1985?

3 A. I have not.

4 Q. Okay. So you don't know that
5 for sure; you're speculating.

6 A. That's correct.

7 MR. SOBOL: You asked her to
8 speculate to begin with.

9 MR. ROTH: I know, but now I
10 need to make clear on the record that
11 that's what she's doing.

12 BY MR. ROTH:

13 Q. Okay. So these are published
14 in 2016, which is well into period three of
15 your preferred direct regression, correct?

16 A. That's correct.

17 Q. And if you look at the summary
18 on the first page, it says: This guideline
19 provides recommendations for primary care
20 clinicians who are prescribing opioids for
21 chronic pain outside of active cancer
22 treatment, palliative care and end-of-life
23 care.

24 Do you see that?

25 A. I do.

1 Q. And do Dr. Parran or
2 Dr. Schumacher include any appropriate use of
3 opioids for palliative care?

4 A. Again, as I summarized their
5 statements, they include -- they include
6 virtually the same terms, and many of those
7 palliative care patients of course are also
8 cancer patients.

9 Q. And they include cancer
10 patients who are not just in hospice in their
11 description, correct?

12 A. That's correct. Cancer
13 patients may be in hospice or not in hospice
14 but at the end of life.

15 Q. And do you know how the
16 journals define end of life?

17 A. Well, I think there are
18 different ways of looking at end of life, and
19 they vary by analysis. I think frequently
20 the last 90 days of life are considered end
21 of life, but I'm -- I don't know that that's
22 a single way of thinking about it.

23 Q. And of course, a doctor who's
24 an oncologist with a patient may not actually
25 know at the time they're prescribing how

1 close they are to the end of life to know
2 whether they're within that definition,
3 right?

4 A. I'd be really impressed if they
5 did know.

6 Q. Yeah. I mean, we all have
7 stories of relatives or friends who were
8 given a month to live and magically lived
9 three or four years with cancer.

10 MR. SOBOL: Objection.

11 BY MR. ROTH:

12 Q. Do you know people like that?

13 A. I don't, but I'm glad that you
14 do.

15 The idea of end of life as you
16 know in my analysis, I use the actual end of
17 life for my simulation, but it may well be
18 that some of those people died without
19 getting an opioid treatment because their
20 doctors were not ready to decide that they
21 were at the end of life.

22 Q. And there may also be people
23 who the doctor thinks is at the end of life
24 that they give an opioid to who actually live
25 longer than the 90-day window in the

1 definition?

2 A. Yes. I think that that is less
3 often the case, given doctors' general
4 reluctance. It's sort of a well-known fact
5 in health policy that doctors are reluctant
6 to acknowledge that the end of life has
7 arrived.

8 Q. But doctors may decide to treat
9 a cancer patient with an opioid even if they
10 don't believe that patient is near the end of
11 life to treat their pain from the malignancy.

12 A. That may well be true, but
13 again, in my simulation, I'm looking at
14 patients who are actually at the end of life.

15 Q. Okay. And by looking at only
16 patients who are actually at the end of life,
17 you're undercounting cancer patients who may
18 be appropriately treated with an opioid to
19 address malignant cancer pain but are not yet
20 at the end of life?

21 A. I will not be including those
22 patients who are not at the end of life, and
23 we can go back to paragraph 92 to see that,
24 like chronic pain, my understanding of
25 clinical experts' opinions about patients who

1 are not at the end of life who are
2 experiencing cancer pain is -- that the same
3 challenges pertain to opioid prescribing in
4 terms of tradeoffs between possible addiction
5 risks.

6 Q. So looking back at the summary,
7 it then says, after the first sentence: The
8 guideline addresses, 1, when to initiate or
9 continue opioids for chronic pain; 2, opioid
10 selection, dosage, duration, follow-up and
11 discontinuation; and 3, assessing risk and
12 addressing harms of opioid use.

13 Do you see that?

14 A. I do.

15 Q. And these guidelines were
16 developed by the CDC, correct?

17 A. Yes.

18 Q. The Centers for Disease
19 Control.

20 A. That's right.

21 Q. And they were developed in
22 2016, well into sensitivity around opioid
23 use, addiction and mortality?

24 MR. SOBOL: Objection, scope.

25 A. It is certainly true at that

1 time period that the opioid epidemic had been
2 recognized.

3 BY MR. ROTH:

4 Q. And then if you look at the
5 introduction in the background section, the
6 first sentence says: Opioids are commonly
7 prescribed for pain.

8 Do you see that?

9 A. Yes.

10 Q. An estimated 20% of patients
11 presenting to physician offices with
12 noncancer pain symptoms or pain-related
13 diagnoses, including acute and chronic pain,
14 received an opioid prescription.

15 Do you see that?

16 A. Yes. And I'm certainly
17 familiar with that fact.

18 Q. So if 20% of patients are
19 receiving opioids for pain, that's a fairly
20 large population of people. Would you agree
21 with that?

22 MR. SOBOL: Objection.

23 A. Well, yes. I mean, you're
24 familiar with the litigation that we're all
25 involved in, and that is the subject of this

1 litigation.

2 So even in 2016, as prescribing
3 rates have begun to fall, they are well above
4 the levels that are -- were observed 20 years
5 ago. So this is precisely the issue that
6 we're talking about is that opioids are
7 overused, according to clinical experts.

8 BY MR. ROTH:

9 Q. Well, they're well above the
10 level of 20 years ago, but there have been a
11 number of new drugs and generics that have
12 entered the market over the last 20 years,
13 correct?

14 MR. SOBOL: Objection.

15 A. Well, the fact that there are
16 new drugs and generics does not mean that
17 increased use is appropriate.

18 BY MR. ROTH:

19 Q. And the mere fact that use has
20 increased over what it was 20 years ago in
21 and of itself does not mean that all of that
22 increase is inappropriate either.

23 MR. SOBOL: Objection, scope.

24 A. In my analysis, as I noted
25 earlier, I'm not parsing the actual uses.

1 And because that is not possible to do in the
2 data, I instead come from the other
3 direction, which is to say, okay, let's look
4 at those uses which are not contested. How
5 much of the growth could they possibly
6 explain.

7 So if the allegations are true,
8 my direct analysis shows a large percentage
9 of prescriptions were caused by the unlawful
10 conduct, and then from this other direction,
11 it appears that the uses that the clinical
12 experts in this matter for plaintiffs
13 consider to be the most appropriate uses only
14 account for a very small percentage of the
15 total.

16 So the statements that you've
17 made are sweeping statements. Mine are much
18 more precise.

19 BY MR. ROTH:

20 Q. Put another way, if Dr. Parran
21 and Dr. Schumacher and plaintiffs' opinions
22 about the appropriate use of opioids were the
23 prevailing medical standard, there would be
24 an extremely small percentage of patients who
25 currently receive opioids in our world that

1 would receive them?

2 MR. SOBOL: Objection, scope.

3 A. Of course it depends on what
4 you mean, if there's a certain path
5 dependence, as I'm sure you're well aware.
6 If we come in today and try to unwind
7 prescribing, there are patients who are
8 already addicted to opioids.

9 But if a world happened in
10 which only the uses described by the clinical
11 experts, plaintiffs' clinical experts were
12 those that for which opioids were used,
13 you're right, that we would see a dramatic
14 reduction in opioid use. That is the entire
15 purpose and conclusion of my analysis.

16 BY MR. ROTH:

17 Q. And if you look at paragraph 1
18 under the background section in this
19 article -- in the guidelines, the last
20 sentence says: Rates of opioid prescribing
21 vary greatly across states in ways that
22 cannot be explained by the lack -- sorry, let
23 me start over.

24 The CDC guidelines say: Rates
25 of opioid prescribing vary greatly across

1 states in ways that cannot be explained by
2 the underlying health status of the
3 population, highlighting the lack of
4 consensus among clinicians on how to use
5 opioid pain medication.

6 Do you see that?

7 A. I do.

8 Q. So if marketing is national,
9 and all physicians are equally affected by
10 marketing, what explains the geographic
11 variation in prescribing the CDC is
12 highlighting?

13 MR. SOBOL: Objection, scope.

14 A. Well, as we talked about
15 before, and as you can see in the indirect
16 analysis, there are county-level factors that
17 explain variation in shipments.

18 BY MR. ROTH:

19 Q. My question was a little
20 different.

21 This article is talking about
22 variation in prescribing, and what I'm trying
23 to understand is if marketing is national and
24 all doctors are affected, how could it be
25 that there is variation in prescribing on a

1 geographic basis?

2 MR. SOBOL: Objection, scope.

3 A. There -- prescribing and
4 shipments are not different things. They're
5 the same thing. The shipments result from
6 prescriptions. And there are different
7 baselines in different geographic areas,
8 different baselines in terms of the level of
9 use, in terms of all of those socioeconomic
10 and demographic factors.

11 THE WITNESS: I hope you can't
12 hear that on the tape.

13 A. So that variation exists, and
14 then if a national promotional campaign will
15 have different effects based on the
16 underlying area characteristics.

17 BY MR. ROTH:

18 Q. And the CDC highlights that
19 there's a lack of consensus among clinicians
20 on how to use opioid medication.

21 Do you see that?

22 A. I do see that.

23 Q. And again, that means that
24 promotion alone is not driving some consensus
25 view as to the efficacy and safety of

1 opioids?

2 MR. SOBOL: Objection, scope.

3 A. Well, I'm not sure how you
4 derive anything from this about promotion.
5 The fact that there's a lack of consensus
6 among clinicians does not mean that promotion
7 hasn't driven this increase in the aggregate.
8 There may well be variation among clinicians
9 in the extent to which they've responded to
10 that promotion, but again, in the aggregate,
11 that's really what my analysis is about, is
12 what is the total.

13 There may be variation across
14 areas and across physicians, and still the
15 question is sort of what has happened to the
16 overall growth over this time period.

17 Q. How much aggregation do you
18 need to do to show that promotion has an
19 overall growth effect?

20 A. I'm not sure I understand your
21 question.

22 Q. Well, we seem to be agreeing
23 that at a physician level there could be
24 variation in the effect of promotion, right?

25 A. There can be variation at a

1 physician level. That doesn't mean -- my
2 point was that physicians may start in
3 different places, they may be -- they may
4 have a bigger effect because they have more
5 patients of a particular type, but -- but
6 still, there's a total effect.

7 And again, in this matter as I
8 understand it, the court needs to know what
9 the whole effect is, and the fact that it may
10 be smaller for one physician and larger for
11 another is -- does not seem relevant as I
12 understand it to the task of proving impact.

13 Q. Understood. But even when
14 aggregated up to a geographic level, the CDC
15 is highlighting a lack of consensus among
16 clinicians, and I agree that marketing may
17 not affect all doctors equally, but your
18 model seems to suggest that everyone is
19 equally affected by marketing.

20 MR. SOBOL: Objection, asked
21 and answered.

22 A. You misunderstand the nature of
23 an aggregate model. Again, I calculate an
24 average effect. I do not assume that there's
25 no variation in that average.

1 BY MR. ROTH:

2 Q. Right. So that gets back to
3 the question I asked three questions ago.

4 How much do you need to
5 average? How far up the chain do you need to
6 go? It's not at the doctor level, it's not
7 at the geographic level. Where do you start
8 seeing the aggregative effects overcome
9 variation in the effect of promotion?

10 A. I'm sorry, I don't mean to
11 laugh, but that is just a very strange idea.

12 So anything you average over
13 has variation. So at any level the average
14 captures variation. And again, what I'm
15 interested in here is the aggregate effect,
16 and so I have looked at that effect. If one
17 were interested in ascertaining something
18 about variability, then you would
19 disaggregate the data.

20 But the -- every average
21 contains some kind of variation unless it's
22 not a very interesting average of things that
23 are exactly alike.

24 Q. Let's look at page 3, the top
25 paragraph on the left side says:

1 Professional organizations, states and
2 federal agencies, e.g., the American Pain
3 Society/American Academy of Pain Medicine,
4 the Washington Agency Medical Directors Group
5 and the U.S. Department of Veteran
6 Affairs/Department of Defense have developed
7 guidelines for opioid prescribing.

8 Do you see that?

9 A. I do.

10 Q. And why do you think the
11 Department of Veteran Affairs and Department
12 of Defense has their own guidelines for
13 opioid prescribing?

14 MR. SOBOL: Objection, scope.

15 A. Because they provide medical
16 care or reimburse medical care for active
17 duty -- what is the general word -- military,
18 active duty military as well as veterans.

19 BY MR. ROTH:

20 Q. And then it says: Existing
21 guidelines share some common elements,
22 including dosing thresholds, cautious
23 titration and risk mitigation strategies such
24 as using risk assessment tools, treatment
25 agreements and urine drug testing. However,

1 there is considerable variability in the
2 specific recommendations, e.g., range of
3 dosing thresholds of 90 morphine milligram
4 equivalents a day to 200 morphine milligram
5 equivalents a day, audience, e.g., primary
6 care physicians versus specialists, use of
7 evidence, e.g., systematic review, grading of
8 evidence and recommendations and role of
9 expert opinion, and rigor of methods for
10 addressing conflict of interest.

11 Do you see that?

12 A. I do.

13 Q. And then it says: Most
14 guidelines, especially those that are not
15 based on evidence from scientific studies
16 published in 2010 or later, also do not
17 reflect the most recent scientific evidence
18 about risks related to opioid dosage.

19 So not only is there regional
20 variation, but actually in the medical
21 community, there's variation in prescribing
22 standards for opioids?

23 MR. SOBOL: Objection, scope.

24 BY MR. ROTH:

25 Q. Do you agree that's what the

1 CDC is saying?

2 MR. SOBOL: Objection, scope.

3 A. I think what the CDC is saying
4 is that both across professional
5 organizations -- I think it's a little
6 broader than the medical community, since
7 we're talking about agencies, that guidelines
8 vary.

9 BY MR. ROTH:

10 Q. And I assume, based on your
11 testimony throughout the last two days and
12 this sort of contagion effect that Dr. Perri
13 coined, your view would be that those medical
14 associations are influenced by the effect of
15 manufacturers' promotion as well?

16 A. I believe that plaintiffs
17 specifically point to those influences in the
18 complaint, and so, of course, that is --
19 between that and Dr. Perri's report is where
20 I get my information. I have not made an
21 individual assessment of this.

22 Q. Again I ask, if promotion is
23 this unifying thing that influences all
24 physicians equally, why is there a
25 variability in the guidelines that

1 professional organizations come out with for
2 the prescription and use of opioids?

3 MR. SOBOL: Objection,
4 mischaracterizes prior testimony.

5 A. As I noted earlier, promotion
6 will have effects that are different for
7 different physicians, no doubt different
8 professional organizations.

9 Because it has the same
10 direction of effect doesn't mean they all
11 start in the same place or end in the same
12 place, and so guidelines vary across a number
13 of seemingly well-accepted clinical areas.

14 BY MR. ROTH:

15 Q. And the effect that promotion
16 has, if any, on those guidelines will also
17 vary?

18 A. The effect of promotion on
19 those guidelines may also vary.

20 Q. And neither your direct nor
21 indirect regression models do anything to
22 measure the effect of medical guidelines on
23 the prescription and use of opioids?

24 MR. SOBOL: Objection, asked
25 and answered, mischaracterizes prior

1 testimony.

2 A. The direct model, Model C,
3 includes events for guideline dissemination,
4 and -- and the guidelines are not included in
5 the indirect model.

6 BY MR. ROTH:

7 Q. In Model C you've got the five
8 events -- I don't remember all of them from
9 memory. I probably will soon. I think one
10 was the joint consensus statement, which was
11 a guideline; is that right?

12 A. Yes, that's correct.

13 Q. Were any of the others
14 guidelines?

15 A. The JCAHO standards are similar
16 to guidelines in they set expectations for
17 hospitals.

18 Q. Okay. And beyond those two, I
19 don't think the other three events were
20 guideline related.

21 A. Federation of State Medical
22 Boards, those, I believe, are focused really
23 on liability issues.

24 Q. Did you consider using, for
25 example, the CDC guidelines or other

1 guidelines to test how your model would
2 respond in Model C?

3 MR. SOBOL: Objection.

4 A. The CDC guidelines come out in
5 2016, which is at the tail end of my data,
6 and as we talked about before, it was
7 apparent to me when I included five events
8 that simply adding more effects was not going
9 to improve the performance of the model.

10 BY MR. ROTH:

11 Q. It wouldn't improve the
12 performance of the model, but it might show
13 that the performance of the model didn't
14 stand up once you added multiple events?

15 MR. SOBOL: Objection, asked
16 and answered.

17 A. Well, the fact that a model
18 with more events did not look good doesn't
19 mean the model that I chose with no events
20 was unreliable.

21 BY MR. ROTH:

22 Q. If you look at page 17 of the
23 CDC guidelines --

24 A. Incidentally by the way, I
25 didn't try that model, so I don't know what

1 it looks like.

2 Q. Good clarification.

3 So page 17 is the start of a
4 long discussion of 12 bolded points that
5 clinicians should consider when prescribing
6 opioids for chronic pain.

7 Do you see that?

8 A. I see -- let's see.

9 Q. There are headings in
10 between --

11 A. Yes.

12 Q. -- so it's hard to track,
13 but --

14 A. I see 12, yes.

15 Q. Okay. And again, this is not
16 consistent with the view that no patients
17 should ever receive opioid for chronic pain;
18 it just highlights thing clinicians should
19 consider before prescribing opioids for
20 chronic pain?

21 MR. SOBOL: Objection, scope.

22 A. I don't believe anywhere in my
23 report I summarize a clinician's opinion that
24 no patients should receive opioids for
25 chronic pain.

1 BY MR. ROTH:

2 Q. I don't want to go through all
3 12, but I do want to ask about a couple.

4 A. Okay.

5 Q. So if you look at page 21.

6 A. Sure.

7 Q. Number 4 in the section Opioid
8 Selection, Dosage, Duration, Follow-Up and
9 Discontinuation.

10 Do you see that?

11 A. I do.

12 Q. It says: When starting opioid
13 therapy for chronic pain, clinicians should
14 prescribe immediate-release opioids instead
15 of extended-release/long-acting, ER/LA,
16 opioids, recommendation category A, evidence
17 type, 4.

18 Do you see that?

19 A. I do.

20 Q. So the CDC is making some
21 distinction between immediate-release and
22 extended-release long-acting opioids.

23 Do you agree with that?

24 A. Yes, this recommendation
25 specifically applies to immediate-release

1 opioids, yes.

2 Q. And your models don't
3 distinguish between immediate-release or
4 extended-release opioids or any other
5 distinguishing characteristics of opioids
6 other than calibrating them based on MMEs?

7 MR. SOBOL: Objection.

8 A. In order to accurately capture
9 the impact of the alleged misconduct, I
10 include all forms of opioids, including
11 short- and long-acting.

12 My model is intended to capture
13 any spillover effects, and to the extent that
14 marketing of one product affects use of
15 another, it appropriately captures those
16 spillover effects.

17 To the extent that marketing
18 does not have spillover effects, they won't
19 be detected inappropriately.

20 BY MR. ROTH:

21 Q. Number 5 says -- it's on
22 page 22 -- when opioids are started,
23 clinicians should prescribe the lowest
24 effective dosage. Clinicians should use
25 caution when prescribing opioids of any

1 dosage, should carefully reassess evidence of
2 individual benefits and risks when
3 considering increasing dosage to greater than
4 or equal to 50 MME per day, and should avoid
5 increasing dosage to greater than or equal to
6 90 MME per day, or carefully justify a
7 decision to titrate dosage to greater than or
8 equal to 90 MME per day.

9 Do you see that?

10 A. I do.

11 Q. So the CDC seems to be making a
12 distinction in terms of potency with respect
13 to the clinical guidelines.

14 MR. SOBOL: Objection.

15 A. Okay.

16 MR. SOBOL: Scope.

17 A. So they're talking about
18 effective dosing.

19 BY MR. ROTH:

20 Q. And again, that's not something
21 you control for in your regression models?

22 A. That doesn't make any sense as
23 something to control for. Again, I
24 appropriately used the number of MMEs as the
25 dependent variable, so that is recognizing

1 that the number of MMEs is what is clinically
2 relevant when it comes to ultimately the
3 harms that Professor Cutler looks at.

4 And so I do, in fact, capture
5 MMEs in my model.

6 Q. Okay. So we had an extended
7 conversation yesterday about the depreciation
8 factor, and you said it was justified because
9 opioids are addictive and patients need to
10 titrate up.

11 Do you remember that?

12 A. Yes.

13 Q. How does that assumption hold
14 in light of the CDC's clinical guidelines
15 suggesting that physicians should maintain
16 patients on lower doses?

17 MR. SOBOL: Objection, form.

18 You can answer.

19 A. Are you suggesting that because
20 the 2016 guidelines warn physicians on not
21 increasing doses that none of that happened
22 during the period of my analysis, 1995 to
23 2018?

24 BY MR. ROTH:

25 Q. Well, I'm asking the questions,

1 but I'm just suggesting that you didn't
2 account for it in your analysis, including
3 after 2016 when these guidelines were
4 published.

5 MR. SOBOL: Objection.

6 You can answer.

7 A. I would respectfully disagree
8 with that characterization. My analysis
9 incorporates exactly that, and yesterday we
10 had a brief conversation about a chart that
11 shows the increasing MMEs per prescription
12 that demonstrate that doctors were clearly
13 not following this guideline.

14 This is precisely the concern
15 with the opioid epidemic is that dosing has
16 continued to ramp up, and, you know, whether
17 or not this guideline has influenced
18 physicians to date, there's certainly plenty
19 of evidence that there were increased dosing
20 patterns over time for patients who were on
21 opioids.

22 MR. ROTH: Okay. Why don't we
23 stop for a minute. I don't know if
24 lunch is here, but this would not be a
25 bad time to break since it's around

1 noon.

2 THE WITNESS: Sure, that's
3 great.

4 THE VIDEOGRAPHER: The time is
5 11:54 a.m. We're now off the record.

6 (Recess taken, 11:54 a.m. to
7 12:30 p.m.)

8 THE VIDEOGRAPHER: The time is
9 12:30 p.m. We're back on the record.

10 BY MR. ROTH:

11 Q. All right. So I'd like to go
12 kind of component by component through your
13 simulation on appropriate use, if that's
14 okay.

15 A. Okay. Great. I'll just get to
16 the right section.

17 Q. Paragraph 95 is the start of
18 the cancer pain section.

19 Are you there?

20 A. Yes.

21 Q. So you say: The first group of
22 patients with potentially undertreated pain
23 includes cancer patients at the end of life/
24 in hospice. I use epidemiologic data on
25 cancer deaths in each year to identify the

1 size of this population.

2 And that's consistent with what
3 you said earlier, you just looked at
4 end-of-life cancer patients, correct?

5 A. That's correct.

6 Q. Why just limit to end-of-life
7 cancer patients as opposed to patients with
8 other malignancy associated with cancer?

9 A. Sure. As I understand clinical
10 experts' opinions and just some of the basic
11 risks of opioids, that, of course, people at
12 the end of life, the -- any concern about
13 addiction is attenuated because of the fact
14 that their timeline is short.

15 And so those patients are
16 distinct from patients who may have continued
17 use and continued life beyond -- beyond the
18 point of malignant cancer pain.

19 Q. So -- but in paragraph 92 when
20 you summarize Dr. Schumacher and Dr. Parran,
21 you separately refer to end-of-life pain,
22 hospice care and cancer pain from active
23 malignant disease.

24 Do you see that?

25 A. Yes, that's correct. So again,

1 in footnote 121, I explain a bit there. I
2 say I do not attempt to separately identify
3 these patients for lack of complete data and
4 because I understand there's more clinical
5 nuance, so again, that doctors will need to
6 trade off addiction risks in those patients
7 as I understand the clinical opinions.

8 Q. Okay. So your thought analysis
9 just includes end-of-life cancer patients,
10 not other cancer parents with malignant
11 disease for the reasons you say in
12 footnote 121?

13 A. Yes, that's correct.

14 Q. Why do you not include other
15 patients in hospice beyond cancer patients?

16 A. Yes, again, a two-part -- and
17 I'm trying to see exactly what I say in
18 footnote 121. But many patients in hospice
19 are in fact cancer patients. Cancer patients
20 are really the group of patients for whom
21 hospice was originally designed, and while it
22 has spread to other reasons that people are
23 facing the end of life, cancer patients are,
24 particularly in the early years, I believe,
25 based on the -- my general knowledge of

1 hospice, the majority of those patients.

2 Q. Have you studied a breakdown of
3 the demographics of hospice by diagnosis to
4 know that that's true?

5 A. I know just from my knowledge
6 of the area that cancer has been the
7 condition around which hospice -- both
8 hospice and really palliative care have been
9 focused in the beginning, and it's a general
10 health policy debate, the need to expand
11 hospice and palliative care to other groups,
12 so I understand that cancer is a dominant
13 condition for those groups.

14 Q. You are aware that patients
15 with other medical diagnoses than cancer may
16 wind up in hospice?

17 A. Yes, I'm aware of that.

18 Q. Congestive heart failure
19 patients could be in hospice, correct?

20 A. Yes.

21 Q. Or ALS patients, correct?

22 A. Yes.

23 Q. And we can play this game --

24 A. I am aware of that.

25 Q. -- with many conditions that

1 are unfortunately terminal, but no matter,
2 you only include the cancer hospice patients
3 in your thought analysis.

4 A. Well, I include cancer patients
5 at the end of life.

6 Q. Right. You make no attempt to
7 capture other noncancer-diagnosed hospice
8 patients at the end of life?

9 A. I do not. And again, as I note
10 in footnote 121, I believe, my sensitivity
11 analysis will likely capture those groups.

12 Q. Well, in footnote 121, you're
13 actually just talking about -- yeah, okay. I
14 see, patients dying from other conditions.
15 Okay.

16 And then in order to calculate
17 the amount of -- well, let me backtrack
18 because I can't let this go.

19 So when you say your
20 sensitivity analysis, that's truly just
21 modeling a 50% increase in your parameters?

22 MR. SOBOL: Objection.

23 A. The sensitivity analysis is
24 modeling a 50% increase, so that could
25 pertain to a 50% increase in the populations

1 treated.

2 BY MR. ROTH:

3 Q. And where did you come up with
4 50%?

5 A. In simulation analysis, people
6 frequently use estimates to get at possible
7 measurement error, which are inherently
8 speculative. So this was to me a very
9 generous speculation about how big the error
10 could be.

11 Q. It's a statistical choice, it's
12 not a choice based on any analysis of medical
13 data?

14 A. It is a modeling choice, yes.

15 Q. Okay. And then in paragraph 96
16 you say: For my simulation I take a
17 conservative approach and assume that 100% of
18 cancer patients at the end of life need and
19 want a high dose of oral extended-release
20 opioids.

21 Do you see that?

22 A. I do, except you corrected my
23 order.

24 Q. I transposed -- I think your
25 order is fine, I just transposed it for some

1 reason.

2 Then you say: This assumption
3 is extremely conservative in light of
4 plaintiffs' clinical expert, Dr. Parran's,
5 opinion.

6 Do you see that?

7 A. Yes.

8 Q. And Parran's been withdrawn.
9 Do you have any other basis for saying that
10 it's extremely conservative to assume that
11 all cancer patients at the end of life need
12 and want a high dose of opioids?

13 MR. SOBOL: Objection.

14 A. Well, I think it's -- I'm not a
15 clinician, so I -- I think it's unreasonable
16 to assume that a hundred percent of patients
17 want anything, particularly given the side
18 effects of opioids unrelated to addiction,
19 increased risk of death from respiratory
20 issues, et cetera.

21 So I would say that a hundred
22 percent must be conservative.

23 BY MR. ROTH:

24 Q. And then you say: For dosing,
25 my baseline assumption is 80 MMEs per day,

1 which is consistent with average dosing in
2 cancer patients reported in public studies.

3 Do you see that?

4 A. I do.

5 Q. Then you cite the Haider
6 Journal of Oncology article?

7 A. Yes, that's correct.

8 Q. Are there any other published
9 studies you're relying on, or is that the one
10 you're relying on?

11 A. That's the one I rely on, and
12 as noted, those choices were reviewed by
13 Dr. Schumacher and Parran.

14 Q. And I assume, since you're not
15 a doctor, the Haider study was something that
16 either Dr. Schumacher, Dr. Parran or counsel
17 directed you to?

18 A. I believe that I identified
19 that article.

20 Q. Okay. Spending time on PubMed?

21 A. I spend a lot of time on
22 PubMed. As you know, the clinical literature
23 and the health services research literature
24 are quite overlapping. If you've looked at
25 my CVs, I have -- have I published in an

1 oncology journal? I believe I have.

2 Q. So we talked about dosing,
3 which we'll talk about again in a minute, but
4 then you say for duration, that you use the
5 average duration of treatment reported for
6 cancer palliative care as your baseline,
7 which is roughly 64 days.

8 A. That's correct.

9 Q. And where -- that is based on
10 the Carlson study, it looks like?

11 A. Yes, it is.

12 Q. Okay. And so in your thought
13 experiment, if a cancer patient lives a year
14 in excruciating pain, there would be no
15 medically appropriate use for opioids for
16 that patient?

17 MR. SOBOL: Objection.

18 A. Well, I'm not offering a
19 clinical opinion here. I'm conducting an
20 economic simulation based on clinical
21 parameters that are identified from the
22 literature and plaintiffs' clinical experts.

23 So I'm not saying one way or
24 another whether someone who lives beyond
25 those expectations should or shouldn't get an

1 opioid.

2 BY MR. ROTH:

3 Q. So you're not making a medical
4 judgment or a qualitative judgment, but
5 you're still deciding not to include that
6 patient in your potentially acceptable
7 population?

8 MR. SOBOL: Objection. Excuse
9 me. Objection.

10 A. The simulation again, it
11 assumes that every single patient gets some
12 opioid, and then assigns a typical payment
13 based on the sources that I've cited. The
14 length of stay there is an average, so
15 unfortunately, we know that many patients do
16 not actually know that they're dying more
17 than a week or two before they die. As we
18 talked about before, physicians tend to be
19 reluctant to address those issues.

20 So I would imagine there are
21 many patients who in fact would get this kind
22 of opioid treatment for much less than the
23 64 days, and there may well be some that get
24 it for more. But if the duration on average
25 captures that, my simulation will reflect it.

1 BY MR. ROTH:

2 Q. It's like with your other
3 model, it's an average. So there are going
4 to be people above and below the average with
5 respect to treatment time?

6 A. And nonetheless, the aggregate
7 will still be representative.

8 Q. You can average anything,
9 right?

10 MR. SOBOL: Objection.

11 A. Well, if I'm trying to
12 calculate a total, which is what I'm trying
13 to do here, then the average is a sufficient
14 statistic for that total, and so that's --
15 that's why I use it here.

16 BY MR. ROTH:

17 Q. Just so I understand it,
18 though, obviously there's sample size issues
19 when you average something, correct?

20 A. Sample size issues pertain to
21 standard deviations, not to the mean, and
22 here again, I'm using this simulation
23 approach to show an average and not to
24 characterize the variance around that.

25 (Whereupon, Deposition Exhibit

1 Rosenthal-25, 2017 Haider et al
2 Publication, was marked for
3 identification.)

4 BY MR. ROTH:

5 Q. I'm going to mark as Exhibit 25
6 an article entitled Opioid Prescription
7 Trends Among Patients with Cancer Referred to
8 Outpatient Palliative Care Over a 6-Year
9 Period.

10 Is this the Haider study that
11 you cite in footnote 124 of your report?

12 A. It is.

13 Q. And that's the study you relied
14 on to come up with the baseline assumption of
15 80 MMEs per day?

16 A. That's right.

17 Q. Okay. So if you look on the
18 cover page, under Material and Methods, the
19 last sentence says: Data collected included
20 demographics, cancer type and stage, symptom
21 assessment, performance status, opioid type
22 and opioid dose defined as the morphine
23 equivalent daily dose.

24 Do you see that?

25 A. I do.

1 Q. And then in Results, it says:
2 In 2010, median morphine equivalent daily
3 dose before referral was 78 milligrams per
4 day. However, by 2015, the morphine
5 equivalent daily dose had progressively
6 decreased to 40 milligrams per day.

7 A. I see that.

8 Q. And this study looks at the
9 number of MMEs prescribed to 750 patients who
10 were seen as new consultations at MD Anderson
11 Cancer Center between January 1st and
12 April 30th each year from 2010 and 2015?

13 A. That's correct.

14 Q. And this is the only article
15 you rely on for your conclusion that the
16 appropriate treatment is 80 morphine
17 milligram equivalents per day?

18 A. Again, yes, this is the article
19 where I found that dosing and referred it to
20 the clinical experts for their input.

21 Q. And this dosing, again, is for
22 patients who were at the cancer center's
23 outpatient palliative care clinic, correct?

24 A. That's correct.

25 Q. It's not at a hospice facility?

1 A. It was not.

2 Q. So you don't have any articles
3 that you relied on to evaluate the
4 appropriate dosage in MMEs given to
5 end-of-life cancer patients at hospice?

6 A. This high dose estimate was the
7 estimate that I found that was closest to
8 what I was looking for. I think some of
9 these patients may be at the end of life and
10 some are not.

11 Q. And if patients are not yet at
12 the end of life, would you expect their
13 opioid dosing to be higher or lower than
14 patients in hospice?

15 A. It may be, again, that this 80
16 number is lower. I don't know for sure.
17 Again, why I do the sensitivity analysis by
18 saying what if it were 50% higher, so not 80,
19 but 120.

20 Q. And again, you're not a medical
21 doctor, so beyond the Haider article, do you
22 have any basis to say what an appropriate
23 opioid dosage is in MMEs for a hospice
24 patient?

25 MR. SOBOL: Objection.

1 A. Again, I refer these
2 assumptions to the clinical experts for them
3 to validate or contradict them.

4 BY MR. ROTH:

5 Q. And did one of the clinical
6 experts review this part of your report and
7 give you feedback?

8 A. That review was done through
9 counsel.

10 Q. Do you know which clinical
11 expert reviewed your report and endorsed the
12 80 milligrams morphine equivalent for the
13 daily dose for hospice patients?

14 A. I believe that both
15 Dr. Schumacher and Dr. Parran reviewed this
16 section of my report, specifically to look at
17 the assumptions.

18 Q. If you look at e977 of the same
19 article.

20 A. Sorry, you're still on there.

21 Q. We're still on Haider.

22 A. Sure.

23 Q. So on the second column, last
24 paragraph, it says: Despite a robust
25 dataset, there are several limitations to

1 this study. First, patients were treated at
2 a comprehensive cancer center where dedicated
3 palliative care services are available.
4 Hence, data from this single institution
5 cannot be generalized to other clinical
6 settings such as community-based programs.

7 Do you see that limitation?

8 A. I do.

9 Q. And is that something you
10 considered when deciding this was the study
11 to rely on?

12 A. Well, again, because I was
13 seeking an estimate associated with
14 palliative care, end-of-life care in
15 particular, I don't think that limitation
16 would pertain to my use of dosing from this
17 study. I, of course, can't know what's in
18 the authors' minds, but I think what they're
19 talking about is about treatment patterns,
20 and a cancer center may be different than
21 less well organized cancer treatment.

22 Q. So you think when the authors
23 say data from the single institution cannot
24 be generalized to other clinical settings,
25 they mean data from the single institution

1 can be generalized to hospice patients?

2 MR. SOBOL: Objection.

3 A. That is not what I said, but,
4 for example, they are looking at prescribing
5 patterns across molecules and not just
6 dosages, and so it may well be that the kind
7 of prescribing over time that patients get in
8 a cancer center is different.

9 The -- it's not immediately
10 obvious to me why dosing in a cancer center
11 would be different than dosing in -- outside
12 of it. There may be some difference. It's
13 always true that any article relies on a
14 particular dataset, and they will all say
15 that you can't generalize outside of that
16 dataset.

17 BY MR. ROTH:

18 Q. And we've been over this, but
19 you're not an oncologist, correct?

20 A. I'm not an oncologist.

21 Q. So to ascertain the differences
22 between treatment in a cancer center versus
23 hospice, you would just be speculating as to
24 what that might be?

25 MR. SOBOL: Objection.

1 A. Well, I am a health economist
2 who has worked on cancer treatment as the
3 subject of some of my research, so -- so yes,
4 I don't know exactly what differences the
5 authors had in mind, but I can make an
6 informed speculation.

7 BY MR. ROTH:

8 Q. Informed speculation. That's a
9 good one.

10 A. Yes.

11 Q. Is that more admissible than
12 normal speculation?

13 MR. SOBOL: Sounds like to me.

14 THE WITNESS: Absolutely.

15 Speculation with a Ph.D.

16 MR. SOBOL: Shouldn't have
17 asked that.

18 BY MR. ROTH:

19 Q. So then if we look at
20 paragraph 96, we talked about the duration,
21 you said 64 days.

22 A. Yes.

23 Q. And you say you chose 64 days
24 because it's just below the average number of
25 days spent in hospice, which is 70.

1 A. Well, I chose 64 days from
2 another article. I didn't choose 64 as
3 arbitrarily just below 70 days. I'm sorry if
4 you read that sentence that way.

5 Q. Yeah. I mean, it says 64,
6 which is just below the average number of
7 days. I was trying to figure out why you
8 didn't pick 69 or 68 or 70 itself.

9 A. I apologize for the lack of
10 clarity. If you go back to footnote 125, the
11 second article by Wachterman, et al.

12 Q. That one has 64 days?

13 A. That's the length of stay
14 article, yes.

15 Q. And what did the Carlson
16 article or the website you cite report as the
17 average length of stay?

18 A. Right. So the 64 days comes
19 from the Wachterman article. The 70 comes
20 from the website.

21 Q. And why did you choose to
22 credit Wachterman's article over the average
23 from the National Hospice and Palliative Care
24 Organization website -- or research, I should
25 say.

1 A. Sure. Because not every
2 patient at the end of life is in hospice, so
3 the -- the data in the Wachterman article
4 are -- they -- sorry.

5 What I mean is not every
6 patient in the second set of statistics has
7 cancer, whereas the Wachterman article has a
8 cancer subpopulation in it, so it's just more
9 precise. They're very similar. The
10 difference would be about a 10% difference.

11 Q. And I assume you'll tell me
12 that that's captured in your 50% sensitivity
13 analysis.

14 A. Well, that I can tell you, 10%
15 is definitely less than 50%.

16 Q. And what did the Carlson
17 article say the average length of stay was?

18 A. I actually don't recall looking
19 at the length of stay in the Carlson article.

20 Q. Okay.

21 A. We can look at it.

22 Q. So now we're going to do math,
23 which is a little dangerous for me, but we're
24 going to try it.

25 So for one patient receiving

1 end-of-life cancer pain, your two assumptions
2 of 64 and 80 MMEs would get you to 5,120
3 MMEs?

4 A. Okay. I also can't do math
5 without at least a pen.

6 Q. We have an iPhone, so let's try
7 it.

8 A. Let's try it.

9 Q. This is the best deposition
10 tool I've found. So 64 times 80 is 5,120.

11 A. Great.

12 Q. And so to calculate the total
13 number of --

14 MR. SOBOL: How does she know
15 you just didn't type in 5,120?

16 MR. ROTH: She can do it if she
17 wants.

18 THE WITNESS: He has an honest
19 face.

20 MR. SOBOL: Go ahead. Sorry.

21 BY MR. ROTH:

22 Q. To calculate the total number
23 of MMEs associated with end-of-life cancer
24 patients and hospice care for cancer
25 patients, you multiplied the number of cancer

1 deaths each year by 5,120 MMEs?

2 A. Yes. And just to be clear, you
3 added "and hospice," but I'm very clear that
4 I'm calculating treatment for end-of-life
5 cancer patients.

6 Q. Right. Right. And you're not
7 calculating at all for other hospice
8 patients, which is the conversation we just
9 had.

10 A. That's correct.

11 Q. And then where do you get the
12 number of cancer deaths from, which of the
13 datasets is that?

14 A. So that comes, excuse me, from
15 the SEER data.

16 Q. Okay. So then the next
17 category you calculate potentially acceptable
18 MMEs for are patients with acute pain.

19 A. Uh-huh.

20 Q. And on page 66, and that's
21 subdivided into trauma patients and surgical
22 patients.

23 A. Correct.

24 Q. You don't consider any other
25 type of acute pain?

1 A. That's correct.

2 Q. So acute pain related to labor
3 and childbirth would not be something that
4 opioids are appropriate for?

5 A. Well, I'm not a clinical expert
6 but I have actually not heard of people using
7 opioids for labor pain.

8 Q. What about for pain associated
9 with a cesarean section?

10 A. I'm not a clinician, so I think
11 we shouldn't go there.

12 Q. What about for nontraumatic
13 injuries causing acute pain? Those aren't
14 captured by your analysis, correct?

15 A. Well, the -- we can go through
16 in the technical appendix exactly which
17 diagnosis codes are captured, so I'm not sure
18 what you're referring to as nontraumatic
19 injuries, but I think we should probably look
20 at Attachment D.

21 Q. Okay. Let's do that. So where
22 in Attachment D should we go?

23 A. Okay. Let's -- I'm starting on
24 page -- as opposed to table -- D8 and working
25 my way over, so for the clinical

1 classification codes, we include our external
2 causes of injury except for poisoning,
3 overexertion, suffocation, adverse effects of
4 medical care and drugs and other or
5 unspecified causes.

6 Q. So let me pause there.

7 I assume you -- well, maybe I
8 shouldn't assume. Let me just ask.

9 Why do you take out the
10 categories of poisoning, overexertion,
11 suffocation, adverse effects of medical
12 care/drugs and other or unspecified causes?

13 A. Yes. I -- from what my
14 understanding of the definition of
15 appropriate uses under acute pain from the
16 guidelines, these would not fit that
17 category. And again, the underlying
18 assumptions were shared with clinicians.

19 Q. This does lead me to a question
20 I meant to ask you earlier.

21 Do your models, direct or
22 indirect, include any opioid used to treat
23 opioid use disorder, like naloxone or
24 Suboxone, or were those taken out?

25 A. Those were taken out.

1 Q. Okay. So in this analysis, you
2 include all of the IDC-9 trauma codes except
3 for the one specified on page D9?

4 A. That's correct.

5 Q. And apart from what you told me
6 that the clinicians stated these would not be
7 appropriate uses of opioids, you did not have
8 any other basis for excluding them from your
9 trauma numbers?

10 A. Well, I'm not a clinical
11 expert, but I would say, on the face of it,
12 the notion that opioids would be appropriate
13 for adverse effects of medical care or drugs
14 or poisoning is not something I would expect
15 to be true, but I'm not a clinical expert, so
16 I certainly use my judgment as a starting
17 point.

18 Q. And certain opioids like
19 Suboxone or naloxone might be, but are those
20 taken out of this simulation as well?

21 A. They are not in my analysis.

22 Q. Okay. So back to paragraph 98.

23 A. Yeah, way back.

24 Q. So essentially, to measure the
25 incidence of trauma, you use the data with

1 the codes removed as specified in
2 Attachment D?

3 A. That's correct.

4 Q. And you assume that a hundred
5 percent of those patients are treated with
6 opioids?

7 A. That's correct.

8 Q. And then you assume, according
9 to paragraph 98, that each of these patients
10 is treated with 30 MMEs of immediate-release
11 opioids for three to seven days?

12 A. Correct.

13 Q. And for that statement, it
14 looks like you are relying on a white paper
15 from the American Academy of Emergency
16 Medicine, and then the CDC guidelines that we
17 reviewed earlier. Or is it just from the
18 AAEM white paper?

19 A. I think they agree on these
20 points.

21 Q. Okay. So let's look at the
22 AAEM white paper, which I'll mark as
23 Exhibit 26.

24 (Whereupon, Deposition Exhibit
25 Rosenthal-26, AAEM White Paper on

1 Acute Pain Management in the Emergency
2 Department, was marked for
3 identification.)

4 BY MR. ROTH:

5 Q. And this is the white paper you
6 rely on as support for using 30 milligrams
7 for three to seven days for trauma patients.

8 A. You've printed it very small,
9 so --

10 Q. I did not, but someone did, and
11 I apologize.

12 A. That's okay.

13 Q. Do we need a magnifying glass?

14 A. I'm not bothering your glasses.
15 I'm going to hold it two feet in front of me.

16 Q. Well, then my next question is
17 going to be particularly hard for you to
18 answer.

19 MR. SOBOL: Is there a footnote
20 on this?

21 BY MR. ROTH:

22 Q. I was going to ask where you
23 see the 30 milligrams of an immediate-release
24 opioid such as hydrocodone, because I didn't,
25 but you may not be able to see even the text,

1 so that might be a bigger problem.

2 A. Yeah, I'm -- I believe the
3 guidelines -- some of the guidelines say
4 start at the lowest possible dose. I'm not
5 sure the 30 milligrams is in this guideline.

6 I believe that they all say use
7 immediate release. Here, the second bullet
8 under Upon Discharge From the ED: Emergency
9 medicine clinicians should prescribe only
10 immediate-release formulations at the lowest
11 effective dose and for the shortest course,
12 generally two to three days' supply.

13 I think the CDC guidelines say
14 three to seven.

15 BY MR. ROTH:

16 Q. And is the 30 also in the CDC
17 guidelines or is that somewhere else?

18 A. I don't think it actually is,
19 and when I referred clinicians to this
20 language, around the lowest effective dose, I
21 believe that the 30 milligrams comes from
22 getting a translation from clinical experts
23 of what that lowest effective dose is.

24 Q. Okay. So that's clear now.

25 So now as I understand it, your

1 assumption for 30 morphine milligram
2 equivalents for trauma patients comes from
3 Dr. Parran and Dr. Schumacher telling you
4 that's what you should use?

5 MR. SOBOL: Objection.

6 A. There's some other guidelines
7 that we'll get to around surgery that have
8 some more specific doses, where I had those
9 numbers to say, you know, should I use one of
10 these. But they're not in this document.
11 We'll get to them in the next section.

12 BY MR. ROTH:

13 Q. So for trauma, your dosage
14 assumption comes from plaintiffs' experts?

15 A. It is -- yes. The -- the
16 assumption, again, I did -- I used the
17 guidelines to have that qualitative
18 assumption, and I required assistance from
19 clinical experts to make sure that I
20 understood how to translate that.

21 But there were other guidelines
22 that had some quantitative starting points,
23 but not in these ones.

24 Q. And when you say clinical
25 experts, that's Drs. Schumacher and Parran?

1 A. That's correct.

2 Q. So for one patient receiving
3 treatment for trauma in an emergency room
4 setting, you assume 210 MMEs, which is 30
5 times the 7?

6 A. And which we do without a
7 calculator, yes.

8 Q. That's true.

9 And so to calculate the total
10 number of MMEs for all patients who visited
11 an emergency room for trauma, you multiplied
12 the patients in the data times 210?

13 A. The patients in the data times
14 210, yes.

15 Q. With the patients in the data
16 being the page D9 description of which
17 patients you looked at for trauma?

18 A. That's correct.

19 Q. Okay. So now let's talk about
20 surgery, which is paragraph 99. So to
21 identify patients treated with opioids
22 related to surgery, you say the universe is
23 patients who underwent surgery on either an
24 inpatient or an outpatient basis.

25 A. That's correct.

1 Q. And according to studies
2 published around the time of the alleged
3 misconduct, 41% -- sorry. Let me reread
4 that.

5 According to studies published
6 around the time the alleged misconduct began,
7 41% of postsurgical inpatients experienced
8 moderate to severe pain.

9 Did I read that correctly?

10 A. Yes, you did.

11 Q. What do you mean by the time
12 the alleged misconduct began?

13 A. Again, where I reference
14 literature on undertreatment -- well, it's
15 upset, so now I have to go back. I was
16 looking for literature that predated the
17 alleged misconduct, so that -- I just have to
18 see where I first cite the Marks and Sachar
19 paper in that footnote 117. So those are the
20 studies that we talked about at the very
21 beginning of this analysis.

22 Q. Is there any allegation that
23 you're aware of that the alleged misconduct
24 influenced the prescribing of opioids for
25 surgical patients?

1 MR. SOBOL: Objection.

2 A. I -- as I understand the
3 misconduct, the misinformation would affect
4 the treatment of patients being discharged
5 from surgery like any other patients, yes.

6 BY MR. ROTH:

7 Q. So in your view, discharging
8 patients from surgery with opioid
9 prescriptions beyond those prescriptions that
10 you classify as potentially acceptable would
11 be something that plaintiffs are trying to
12 recover for?

13 MR. SOBOL: Objection.

14 A. Well, it sounds like there's
15 both a clinical and nonclinical opinion
16 there, but again, remember this analysis is
17 not decomposing actual use but trying to
18 build up to a set of uses that according to
19 clinical experts could have reasonably
20 consumed opioid quantities over this period.

21 So again, we're not -- we're
22 not sort of looking at what was done and
23 parsing between appropriate and
24 inappropriate. Just say, okay, well, there's
25 going to be a set of people with surgery, and

1 those people surely will have opioid use for
2 some period of time. What would it look like
3 if they all got treated.

4 BY MR. ROTH:

5 Q. So in paragraph 99, you again
6 come up with 30 MMEs and seven days for
7 surgery.

8 A. Yes, that's correct.

9 Q. So same as trauma?

10 A. Yes, the guidelines are quite
11 similar.

12 Q. And for that conclusion that 30
13 MMEs each day is appropriate, you cite the
14 MD Anderson Cancer Center Postoperative Pain
15 Management Guidelines.

16 A. That's right. So that's the --
17 the document that I mentioned did have some
18 quantitative benchmarks in it.

19 (Whereupon, Deposition Exhibit
20 Rosenthal-27, MD Anderson Cancer
21 Center Postoperative Pain Management
22 Guidelines, was marked for
23 identification.)

24 BY MR. ROTH:

25 Q. So let me mark as Exhibit 27

1 the MD Anderson Cancer Center Postoperative
2 Pain Management Guidelines.

3 And is this the document you
4 were citing in your report?

5 A. It is.

6 Q. So it looks like this was
7 approved, if you look at the bottom of the
8 page, on October 30th, 2018.

9 A. Yes, that's correct.

10 Q. And are you aware that the
11 algorithm used by MD Anderson to evaluate
12 doses of pain management is what was used to
13 come up with the dosage number? Strike that.
14 That's not a good question. Let's just turn
15 to page 3.

16 A. Okay. At some point, I would
17 direct you to page 10, but we can go to
18 page 3 first.

19 Q. Okay. We will get to page 10,
20 I promise. It's in here.

21 A. Okay. Good.

22 Q. So it looks like they have sort
23 of like a decision tree flow as to how
24 they're going to come up with dosing for
25 surgical patients, based on pain score.

1 A. That's right.

2 Q. And it identifies different
3 types of pain and the recommended treatment
4 options.

5 A. Yes.

6 Q. So if you look at page 5,
7 Appendix A describes the pain score, and it
8 may or may not have highlighting on it.

9 A. It does. I appreciate the
10 highlighting.

11 Q. Now you can see where we're
12 going.

13 A. That's great.

14 Q. So if you look at page 5 in
15 Appendix A, it says no pain is zero, mild is
16 1 to 3, moderate is 4 to 6 and severe is 7 to
17 10.

18 Do you see that?

19 A. I do.

20 Q. And then if you go back to
21 page 3.

22 A. To page 3, okay.

23 Q. So for patients with a pain
24 score of less than 3 who are not currently
25 taking opioids, they recommend using

1 nonopioids or weak opioids.

2 Do you see that?

3 A. Yes.

4 Q. And then for opioid treatment
5 they refer to Appendix E, which is page 10,
6 which we'll talk about in a minute.

7 A. Okay.

8 Q. Correct?

9 A. Yep.

10 Q. For patients with a pain score
11 less than 3 who are currently taking opioids,
12 MD Anderson recommends continuing the use of
13 opioids and again refers to Appendix E.

14 A. Yes.

15 Q. For patients with a pain score
16 greater to or equal than 4 and who are not
17 taking opioids, MD Anderson recommends
18 short-acting opioids.

19 Do you see that?

20 A. I do.

21 Q. And again refers to Appendix E,
22 correct?

23 A. Yes.

24 Q. And then for patients with a
25 pain score greater than or equal to 4 who are

1 currently taking -- who are not currently
2 taking opioids, MD Anderson recommends
3 short-acting opioids -- we just did that one.
4 Okay. Strike that. I'm getting tired.

5 For patients with a pain score
6 greater than or equal to 4 who are currently
7 taking opioids, MD Anderson recommends
8 increasing the scheduled opioid dose.

9 A. Yes.

10 Q. All right. So now let's go to
11 Appendix E on page 10. And we've
12 conveniently highlighted this for you.

13 So if you look at
14 hydrocodone --

15 A. Yes.

16 Q. -- it recommends 30 milligrams
17 a day, right, 5 to 10 milligrams every six
18 hours?

19 A. Yes. So 5 would be 20, right?

20 Q. Sorry, let me back up the
21 truck. Okay. This is wrong.

22 A. Yes.

23 Q. So first we need to look at
24 codeine, which is on the top of the page. So
25 for codeine, it recommends 30 to

1 60 milligrams.

2 Do you see that?

3 A. Yes. I did not consider
4 codeine in the simulation per se, but go
5 ahead.

6 Q. Okay. And now if we look at
7 hydrocodone, it says for short-acting
8 opioids, it's 5 to 10 milligrams every six
9 hours.

10 A. Correct.

11 Q. Which if we do the math on that
12 would be between 20 to 40 a day.

13 A. Yes. And 30 is right in the
14 middle.

15 Q. Okay. And for long-acting
16 opioids, 20 milligrams a day of Hysingla or
17 10 milligrams every ten hours.

18 A. I think in the flowchart we
19 just looked at -- and again, according to
20 clinical experts in this case, long-acting
21 opioids are not recommended.

22 Q. Right. So it's 20 to 40 for
23 immediate-release hydrocodone?

24 A. That's right, and 30 is in the
25 middle of that.

1 Q. It's the average.

2 A. It's the midpoint, it's the
3 average. Yes.

4 Q. But then if you look at
5 morphine, which is on the next page, that's
6 also a short-acting opioid?

7 A. Yes.

8 Q. And it's 5 to 10 milligrams
9 every four hours, which by math would get you
10 30 to 60.

11 A. Yes.

12 Q. So I guess what I'm trying to
13 understand is how you get to 30 when one
14 range is 20 to 40 and the other range is
15 all -- is 30 to 60.

16 A. Sure. Again, that's why --
17 because the guidelines don't give one number,
18 I referred this question to the clinical
19 experts through counsel, and -- and was
20 advised to focus on hydrocodone and was told
21 that 30 milligrams was a reasonable baseline.

22 Again, assuming that there's
23 some patients who will only get 20, some
24 patients who will get more.

25 Q. So again, like with trauma for

1 surgical pain, your decision to take 30
2 morphine milligram equivalents per day was
3 driven by plaintiffs' experts' advice?

4 A. And it's grounded in these
5 guidelines. And again, while the other
6 guidelines that we looked at are qualitative
7 in nature, as I understand the notion of
8 starting with the lowest dose, that seems
9 quite consistent with choosing 30.

10 Q. And so like with trauma, 30
11 times seven is 210, and then you multiply 210
12 for surgery with the number of surgical
13 patients in the data?

14 A. That's correct.

15 Q. And then we should maybe just
16 close the loop on this. So if we go back to
17 the Attachment D.

18 A. Sure.

19 Q. Just to understand what data
20 you're looking at for surgery.

21 A. Yeah.

22 Q. So it looks like page D10.

23 A. Oh, you're in -- it's page D14.

24 I think we're on the same page. Aren't we?

25 Q. Page D10 talks about surgery.

1 A. Oh.

2 Q. Page D14 is surgery in Cuyahoga
3 and Summit.

4 A. I see. I was ahead of you.
5 We'll get to that, I'm sure.

6 Q. Yes.

7 A. Yes. Yes. So Table D(b),
8 which is also terrible labeling.

9 Q. Yes, so Table D(b) explains how
10 you identified surgical procedures, and it
11 says they're identified from the Area Health
12 Resource File and the Health Resources &
13 Services Administration data.

14 Do you see that?

15 A. Yes, that's correct.

16 Q. But then data was only
17 available for 2005, 2010 and 2014?

18 A. That's correct.

19 Q. And so you had to linearly
20 interpolate all the other values.

21 A. Yes, and as you can see, they
22 barely change.

23 Q. But in any event, you only had
24 data for three years, and so the rest of it
25 was interpolated with the data that you had?

1 A. I did interpolate.

2 Q. Okay. And so if you go back to
3 the body of your report, Table 6, which is at
4 page 70, essentially presents the math
5 exercise we've been talking about, correct?

6 A. That's correct.

7 Q. It has kind of the cancer,
8 trauma and surgical MMEs by year from 1995 to
9 2018 based on the inputs and assumptions
10 we've been discussing.

11 A. Yes.

12 Q. And so according to Table 6,
13 just looking at 1995, for example, there were
14 [REDACTED] MMEs potentially clinically
15 justifiable?

16 A. Yes.

17 Q. And then the next column is
18 your sensitivity where you just multiply that
19 number by 50%?

20 A. Correct.

21 Q. And so for 1995, your
22 sensitivity shows [REDACTED] -- sorry,
23 [REDACTED] -- start over.

24 For 1995, your sensitivity
25 shows [REDACTED] MMEs were potentially

1 clinically justifiable with the 50% increase?

2 A. Yes.

3 Q. And that's actually higher than
4 the actual MMEs sold in that year?

5 A. That's correct. So that first
6 number should be a negative.

7 Q. The first number should be a
8 negative? I'm not sure I follow.

9 A. Well, of the total plus 50%, I
10 guess the first -- the percentage there is of
11 the -- of the unadjusted one, so it's
12 correct, but --

13 Q. Yeah, it's correct. And
14 what --

15 A. It actually would be negative
16 if you did the plus 50%.

17 Q. Right. Okay. Thank you for
18 that clarification.

19 A. It shows up in the chart more
20 clearly.

21 Q. And actually, if we just look
22 at '95 alone, even under your methodology,
23 75% of the actual MMEs sold -- or nearly 75%,
24 would be potentially clinically justifiable?

25 A. Could have been accounted for

1 justifiable use by -- by justifiable uses,
2 right? So again, just to be clear that I'm
3 not saying that 75% of actual uses were --
4 were delivered in that way, but they could
5 have been.

6 The level of use was reasonably
7 explained by this measure of need, if you
8 would allow me to use that shorthand.

9 Q. And so if you use your
10 potentially justifiable use methodology,
11 including your 50% sensitivity analysis, it's
12 not until 1997 that you start seeing more
13 than a small departure from the actual MMEs
14 sold?

15 A. Right. So in 1997, the actual
16 is about [REDACTED] higher than the -- those
17 justified by need.

18 Q. And then where is this actual
19 MMEs sold number coming from? The IQVIA data
20 it looks like? It says: Actual MMEs
21 nationally from IQVIA, NPA, ARCOS, CDC.

22 (Clarification requested by the
23 reporter.)

24 MR. ROTH: Okay. Sorry.

25 BY MR. ROTH:

1 Q. The note on this chart is
2 confusing to me because it says: Actual MMEs
3 nationally from IQVIA, NPA, ARCOS and CDC.

4 A. The actual MMEs comes from
5 IQVIA. The CDC part relates to the MME
6 translation. As I sit here, I cannot think
7 of a reason that the ARCOS data are used in
8 the actual MMEs sold.

9 MR. SOBOL: Choice of drugs.

10 BY MR. ROTH:

11 Q. We may have found another
12 errata.

13 A. No, it's more likely that I
14 just can't remember that detail as I sit
15 here.

16 Q. Okay. And then if you look
17 at -- so you've got the chart, and then the
18 next few paragraphs -- or the next paragraph,
19 102 on page 71, says --

20 A. Yes.

21 Q. -- The analysis described above
22 can be applied at the county level. Table 7
23 shows comparable results for the bellwether
24 counties.

25 Do you see that?

1 A. Yes.

2 Q. And so then you've got a
3 Table 7 with the counties.

4 How was the translation of the
5 national analysis to the counties done?

6 A. So beginning with the number of
7 patients in each category, there are
8 county-level data available both on cancer
9 deaths and from the Area Health Resource
10 File, where the surgical cases come from, for
11 the trauma patients they're allocated
12 according to population.

13 Q. And who did that translation?

14 A. That would be my staff at GMA.

15 Q. Would you agree that opioids
16 that plaintiffs' experts believe were
17 clinically justifiable are less likely to
18 cause overdose deaths?

19 MR. SOBOL: Objection.

20 A. I do not know the answer to
21 that question, and again, this is a
22 simulation about what might have been a
23 clinically reasonable increase in opioid use.

24 It is not an assessment of
25 whether, in fact, in these counties or in the

1 nation as a whole these uses were present in
2 the way that I simulate them.

3 BY MR. ROTH:

4 Q. And I think we did talk about
5 this earlier during the course of the last
6 two days, but you don't have any mechanism
7 for translating your calculation of
8 potentially justifiable MMEs in your thought
9 analysis to either of your regression models?

10 A. Well, maybe I'm getting tired,
11 but I'm not sure I understand that statement
12 in the form of a question or question in the
13 form of a statement. So how would I
14 translate this to my regression model?

15 Q. Your regression models don't
16 remove from the impact of defendants'
17 promotion the clinically justifiable MMEs you
18 calculate in your last opinion?

19 A. Again, I simulate them. I'm
20 not identifying them as actually having
21 occurred. And the purpose of my direct and
22 indirect analysis is to quantify the impact
23 of alleged misconduct, whether it resulted in
24 a clinically justifiable use or otherwise.

25 Q. Okay. Did you review or rely

1 on Dr. Kessler's report in this case?

2 A. I did not review or rely on it
3 prior to filing my report.

4 Q. Do you know who Dr. Kessler is?

5 A. I do.

6 Q. Have you seen him testify in
7 other cases you've been involved in?

8 A. I think he has testified in
9 other cases I'm involved with. I want to say
10 that one of the -- one of my old reports that
11 you put in front of me somehow mentioned him.

12 But I certainly know who he is,
13 and I believe he has testified in other cases
14 I've been on, but I've not seen him testify.

15 Q. I'm trying to streamline
16 simultaneously.

17 A. That's fine. Take your time.

18 Q. Do you agree with the statement
19 that it is not a drug by itself that is
20 regulated or that receives approval from the
21 FDA; it is a drug for an intended use that is
22 reviewed and approved by the FDA?

23 A. Well, again, as a layperson,
24 not an FDA expert, I do understand that drugs
25 are approved for specific uses.

1 Q. All right. And we talked a
2 little bit at the beginning of your
3 deposition and a couple of other times about
4 drug labels, so I just want to show you one
5 for now.

6 A. Sure.

7 (Whereupon, Deposition Exhibit
8 Rosenthal-28, Kadian Instructions for
9 Use, was marked for identification.)

10 BY MR. ROTH:

11 Q. And refresh me. I think you
12 said you did not review any -- I think that's
13 wrong. I think you said you'd seen maybe the
14 hydrocodone and OxyContin drug labels?

15 A. I specifically remember seeing
16 those, reviewing those at some point during
17 my analysis.

18 Q. But you did not do a
19 comprehensive review of all the drug labels
20 for all of the opioids at issue in this case?

21 MR. SOBOL: Objection, asked
22 and answered.

23 A. I did not systemically analyze
24 the drug labels.

25 ///

1 Q. And there's a big black box on
2 the left side of the front page.

3 Do you see that?

4 A. I see the black box.

5 Q. And in all capital letters at
6 the top of the box it says: Warning:
7 Addiction, abuse, and misuse; risk evaluation
8 and mitigation strategy, REMS;
9 life-threatening respiratory depression;
10 accidental ingestion; neonatal opioid
11 withdrawal syndrome; interaction with
12 alcohol; and risks from concomitant use with
13 benzodiazapines or other CNS depressants.

14 Do you see that?

15 A. I see that.

16 Q. And that's in all capital
17 letters.

18 A. It is.

19 Q. And then there are seven
20 bullets in all bold that follow underneath in
21 that same black box.

22 Do you see that?

23 A. I do.

24 Q. And have you read a black box
25 warning like this one before?

1 A. I have.

2 Q. In what context?

3 A. Well, when we were talking --
4 I'm -- I may have seen black box warnings in
5 this case. When we were talking about this
6 yesterday, I mentioned that black box
7 warnings were a part of the factual base for
8 the Zyprexa in other antipsychotic litigation
9 I was involved in.

10 Q. Have you done, or are you aware
11 of any research trying to ascertain whether
12 marketing convinces doctors to ignore black
13 box warnings such as the one in front of you?

14 MR. SOBOL: Objection.

15 A. As I mentioned yesterday, I am
16 aware of research about black box warnings
17 and the instances in which they have not been
18 effective, and therefore, ignored by
19 prescribing physicians.

20 And in the antipsychotic
21 litigation I was involved in, I did some
22 analysis that showed that while there was a
23 short-run response to the black box warning,
24 that prescribing returned to its original
25 trend.

1 BY MR. ROTH:

2 Q. Which antipsychotic drug were
3 you involved in?

4 A. Well, you know about Zyprexa --

5 Q. Right.

6 A. -- from the case you put in
7 front of me. I was an expert in several
8 Risperdal cases as well, and the black box
9 warning for atypical antipsychotics is common
10 to all the second-generation drugs.

11 Q. Okay. If you look at the
12 section is labeled Indications and Usage on
13 the same page below the black box warning?

14 A. Yes.

15 Q. It says: Kadian is an opioid
16 agonist indicated for the management of pain
17 severe enough to require daily
18 around-the-clock long-term opioid treatment,
19 and for which alternative treatment options
20 are inadequate.

21 Do you see that?

22 A. I do.

23 Q. And that's the FDA-approved
24 indication and usage?

25 MR. SOBOL: Objection.

1 A. Again, as I understand the FDA
2 label, it contains information on the
3 approved usage. I'm not -- neither a
4 clinician nor an FDA expert. That is my
5 layperson's understanding.

6 BY MR. ROTH:

7 Q. Okay. And do you have any
8 reason to doubt that when the FDA approved
9 the label for Kadian or any other opioid
10 involved in this case, that it underwent the
11 regulatory process required by federal
12 regulations, including receiving studies of
13 efficacy and safety?

14 MR. SOBOL: Objection, scope.

15 A. I could not say one way or
16 another. I don't have the information to
17 evaluate such a proposition.

18 BY MR. ROTH:

19 Q. Okay. Let's look at your
20 report, paragraph 11, which was the summary
21 of your opinions.

22 A. Yes. Not the table, just the
23 paragraph?

24 Q. We can look at both.

25 A. Okay.

1 Q. I think we've made it through
2 all of them now.

3 A. Impressive.

4 Q. There may be one we didn't, so
5 that's what I want to talk about.

6 A. Okay. Good.

7 Q. If you look back at
8 paragraph 11, the second bullet in your
9 summary says -- well, the first bullet,
10 Promotion of pharmaceuticals increase their
11 sales.

12 We talked about that I think a
13 lot yesterday.

14 A. I think so.

15 Q. The second bullet. The alleged
16 unlawful promotion of opioids, if proven,
17 resulted in increased sales of opioids.

18 We talked about that some as
19 well.

20 And then if you look at the
21 table, I think those opinions are captured by
22 Section VI of your report; is that right?

23 A. Section VI and VII generally go
24 to the first bullet point, which is, you
25 know, at a high level, promotion increases

1 sales.

2 Q. I guess what I'm getting at is
3 your econometric models are not cited as a
4 basis for your opinions that either promotion
5 increases sales or that the unlawful
6 promotion, if proven, resulted in an increase
7 in sales.

8 A. Yes. So the econometric models
9 clearly show that the alleged unlawful
10 promotion of opioids caused sales. I don't
11 specifically cite to the econometric models
12 there, but when I reach my conclusions from
13 the models, we can go to that text, I do
14 conclude that the model shows a causal
15 relationship.

16 So even though I don't mention
17 the econometric model specifically until I
18 get to the next bullet point, the fact that
19 I'm identifying the extent there is also
20 premised on the existence of an effect.

21 Q. Okay. I understand now.

22 So if you look at the second
23 bullet point, the last sentence says: As a
24 result, I am of the opinion that the combined
25 effect of the defendant manufacturers'

1 promotion of prescription opioids since 1995
2 was a substantial contributing factor to the
3 increase in the use of prescription opioids
4 in the bellwether communities.

5 Did I read that correctly?

6 A. You did.

7 Q. And that is based largely on
8 the econometric models?

9 A. It's based on all the
10 foregoing.

11 Q. Okay. And I noticed the way
12 you worded that sentence was that the
13 promotion was a substantial contributing
14 factor; is that right?

15 A. That's right.

16 Q. Not that the unlawful promotion
17 was a substantial contributing factor,
18 because as we've discussed, you have no
19 opinion on whether defendants' promotion was
20 unlawful or not; you're relying on counsel's
21 assumption.

22 MR. SOBOL: Objection, asked
23 and answered.

24 A. Again, I -- perhaps I should
25 have repeated the unlawful promotion, if

1 proven. So as you say, I demonstrate that
2 promotion caused sales, and I assume that
3 plaintiffs will prove that all promotion was
4 unlawful.

5 MR. SOBOL: By the defendants.

6 A. All promotion by the defendants
7 was unlawful.

8 BY MR. ROTH:

9 Q. And because you assumed that
10 all promotion by the defendants was unlawful,
11 that assumption would include promotion even
12 if a sales representative only dropped off
13 peer-reviewed literature at a doctor's
14 office?

15 MR. SOBOL: Objection, asked
16 and answered.

17 A. My analysis includes all
18 promotion by defendants. When I calculate
19 the but-for scenario, I remove that
20 regardless if some of that promotion used
21 materials that were FDA approved.

22 BY MR. ROTH:

23 Q. Your analysis also includes
24 promotion by defendants even if the sales
25 representative had no interaction with the

1 prescriber?

2 MR. SOBOL: Objection, asked
3 and answered.

4 A. I think what you're suggesting
5 is that detailing may involve an interaction
6 with someone else in the office? Is that
7 what you're referring to?

8 And, yes, as I understand the
9 matter at hand, that the entire promotional
10 enterprise is what is at issue here, and so I
11 have appropriately captured all detailing in
12 my econometric model.

13 BY MR. ROTH:

14 Q. Your analysis includes all
15 promotion by defendants even if that
16 promotion did not result in any change in the
17 prescriber's behavior after they were
18 detailed?

19 A. Well --

20 MR. SOBOL: Objection.

21 A. -- actually, I would
22 respectfully disagree with that. My analysis
23 only attributes impact where promotion
24 resulted in an increase in sales.

25 ///

1 BY MR. ROTH:

2 Q. But you include in your
3 analysis details that may have had no effect
4 on the particular prescriber's behavior?

5 MR. SOBOL: Objection, asked
6 and answered.

7 A. And if that is the case, then
8 it reduces the incremental effectiveness of
9 promotion that I observe, and therefore, the
10 calculated impact. The possibility that some
11 details did not produce change is
12 incorporated into the estimates.

13 BY MR. ROTH:

14 Q. You include in your analysis
15 detailing where the prescriber's rate of
16 prescription may have actually decreased
17 after the detail?

18 MR. SOBOL: Objection, asked
19 and answered.

20 A. My analysis will incorporate
21 the effects, negative or positive. Obviously
22 on average they're positive. If there are
23 some negative changes after a detail for some
24 reason, those again will reduce the measure
25 of impact.

1 BY MR. ROTH:

2 Q. You include in your analysis
3 detailing even if the prescriber never
4 prescribed the medicine he or she was
5 detailed on?

6 MR. SOBOL: Objection.

7 A. Yes. Again, just like the --
8 any detailing that has no effect or a lower
9 effect, I guess that would be a version of no
10 effect, if the individual detailed never
11 prescribed. And again, that will reduce the
12 impact of detailing in my model.

13 BY MR. ROTH:

14 Q. You include in your analysis
15 detailing to prescribers who were already the
16 lead authors of journal articles on the
17 addiction risk of opioids at the time they
18 were detailed?

19 MR. SOBOL: Objection.

20 A. If there is such detailing in
21 my data, again, my estimates will
22 appropriately reflect a reduced effectiveness
23 of promotion for those details.

24 BY MR. ROTH:

25 Q. Your analysis includes

1 detailing to oncologists prescribing for
2 end-of-life cancer pain?

3 A. Again, to the extent that my
4 analysis does not grow the size -- sorry, to
5 the extent that promotion does not grow the
6 size of the market by expanding the use of
7 opioids, detailing, for example, to
8 oncologists who may already have been
9 prescribing opioids will not result in
10 impact.

11 Q. Your analysis includes
12 detailing to prescribers who are hospice
13 specialists for end-of-life pain.

14 A. To the extent that there is
15 detailing to hospice providers in my data and
16 those uses would have occurred regardless of
17 the promotion, my analysis will appropriately
18 capture those effects.

19 Q. Your analysis includes
20 detailing to prescribers who may be
21 performing surgery or trauma intervention in
22 the emergency room?

23 A. Again, to the extent that
24 those -- my analysis will calculate the uses
25 that occurred in this market as a result of

1 the alleged misconduct. Regardless of how
2 those opioid prescriptions were used in
3 practice, as I understand, is appropriate to
4 my assignment.

5 Q. Stated differently, your
6 analysis includes any detailing in the data
7 regardless of to whom it was -- let me start
8 over.

9 Stated differently, your
10 analysis -- can we just get a clean question
11 and answer. Say something.

12 A. Yes. What was the question? I
13 don't know what the question is.

14 Q. Stated differently, your
15 analysis includes any detail in the data,
16 regardless of who was detailed, what was said
17 or what behavior changed or did not after the
18 detail?

19 A. So my analysis is consistent
20 with my assignment in that I examine and
21 quantify the aggregate market expansion that
22 occurred as a result of defendants' promotion
23 during the period from 1995 to the end of my
24 data in 2018. I do not disentangle the types
25 of detailing; however, to the extent there

1 are differential effects of detailing across
2 groups, those will be incorporated into the
3 estimates.

4 MR. ROTH: Our time may be
5 done. Let's take a quick break. And
6 I may have more questions or someone
7 else may.

8 THE WITNESS: Okay.

9 THE VIDEOGRAPHER: The time is
10 1:35 p.m. We're now off the record.

11 (Recess taken, 1:35 p.m. to
12 1:51 p.m.)

13 THE VIDEOGRAPHER: The time is
14 1:51 p.m. We're back on the record.

15 BY MR. ROTH:

16 Q. Professor Rosenthal, in Table 2
17 you calculate the total percent of MMEs
18 attributable to defendants' promotion to be
19 [REDACTED] of MMEs; is that right?

20 A. That's right.

21 Q. To what do we owe the other
22 [REDACTED] of MMEs?

23 A. The other [REDACTED] -- excuse me -- [REDACTED]
24 percent of MMEs are owed to the promotion
25 that is not excluded in the but-for scenario,

1 so again, because I start my data as early as
2 I can in '93, there's a stock of promotion
3 that builds up, and then there's
4 non-defendant promotion. So all those things
5 are left in the model.

6 Q. So it's promotion prior to '95
7 by anyone and non-defendant promotion
8 thereafter?

9 A. That's correct.

10 Q. And that explains [REDACTED] of the
11 MMEs with the remainder being explained by
12 defendants' promotion from 1995 to 2018?

13 A. That's generally correct. You
14 know, there's a constant in the model, which
15 I think we could go to Table 1 and in
16 Model B, so there's a baseline level of
17 [REDACTED] MMEs.

18 Q. Okay.

19 A. So that's in there as well.

20 Q. And then the same question for
21 the indirect model, you calculate [REDACTED] of MMEs
22 due to excess shipments, so is it fair to say
23 based on your approach that the other [REDACTED] is
24 due to the demographic and socioeconomic and
25 other factors you model for?

1 MR. SOBOL: Objection.

2 A. That would be due to the
3 changes in all of those factors. Again,
4 price actually has a negative effect, but the
5 trend which is intended to proxy for
6 non-defendant promotion and those other
7 demographic, socioeconomic and healthcare
8 variables.

9 BY MR. ROTH:

10 Q. Okay. And then if you look
11 back at page 19 of your report, Figure 1.

12 A. Sorry, excuse me. I should
13 just say again, in the indirect model as in
14 the direct model there's also a baseline,
15 right, so we're projecting growth from '95
16 forward. So there's a baseline level.

17 Q. Got it.

18 So if you look on Figure 1 on
19 page 19, we haven't actually talked about
20 this diagram yet.

21 A. Okay. Page 19. Yes.

22 Q. And is this a diagram you've
23 used in other expert reports before?

24 A. I tailored this one
25 specifically for this report, but I have used

1 similar kinds of diagrams.

2 Q. And if we look at your diagram,
3 you have the ecosystem of promotion in all of
4 the lines between the various constituencies,
5 and in the box in the middle, there's
6 detailing, professional journals, samples,
7 and meetings and events.

8 Do you see that?

9 A. Yes.

10 Q. And as we discussed, your model
11 only accounts for detailing promotion, not
12 for any of the other items in the box or any
13 of the other boxes on Figure 1?

14 MR. SOBOL: Objection,
15 mischaracterizes the testimony, asked
16 and answered.

17 A. The direct model includes the
18 measure of detailing only. The indirect
19 model is intended to capture all of these
20 kinds of marketing tools.

21 BY MR. ROTH:

22 Q. And then Table 3, which we've
23 been round and around on, to the extent that
24 you used Table 3 to assess the delta between
25 a defendant's promotion percentage and the

1 baseline percentage, that delta is capturing
2 how that defendant's promotion relates to the
3 aggregate average; is that right?

4 MR. SOBOL: Objection, asked
5 and answered.

6 A. As we discussed earlier, I
7 don't use the table in that way. I'm using
8 it to narrow the aggregate by excluding
9 individual defendants.

10 And when I do that, for
11 example, to exclude Aventis, just as an
12 alphabetically first choice, I am excluding
13 ultimately the effect that I observe in the
14 econometric model of Aventis' marketing,
15 whether that generates sales for its product
16 or someone else's product.

17 MR. ROTH: Okay. I think with
18 that I am done for the time being.
19 It's been a pleasure. I believe
20 Mr. Metz has some questions, so I will
21 be passing the microphone to him. And
22 I can't promise I won't come back,
23 depending on what else happens, but
24 thank you so much.

25 THE WITNESS: Okay. Thank you.

1 THE VIDEOGRAPHER: The time is
2 1:56 p.m. We're now off record.

3 (Recess taken, 1:56 p.m. to
4 1:58 p.m.)

5 THE VIDEOGRAPHER: The time is
6 1:58 p.m. We're back on the record.

7 EXAMINATION

8 BY MR. METZ:

9 Q. Good afternoon, Professor
10 Rosenthal.

11 A. Good afternoon.

12 Q. My name is Carl Metz. I
13 represent Cardinal Health, which is one of
14 the distributor defendants in this case.

15 A. I apologize for forgetting the
16 name of your employer as it were.

17 Q. That's all right. You're
18 referring to testimony yesterday where you
19 were asked about the distributor defendants,
20 you named two companies, and the third name,
21 Cardinal, eluded you. Yes?

22 A. Exactly, yes.

23 Q. Okay. At various places in
24 your report, you refer to marketing
25 defendants, correct?

1 A. Yes, I do.

2 Q. And then in other places, and
3 I'm sure this is not by design, you refer to
4 the word "defendants" without
5 differentiation.

6 MR. SOBOL: Objection to the
7 form.

8 You can answer.

9 A. Yes, I believe I use that term.
10 We could look to see how I use it.

11 BY MR. METZ:

12 Q. For example, in paragraph 64,
13 which you're welcome to look at, and I'll
14 quote this just partially. You say, quote:
15 A causal relationship between the
16 defendants', possessive, promotion and
17 prescriptions of opioids.

18 Do you see that?

19 A. Yes.

20 Q. And do I understand based on
21 your testimony over the last two days that
22 despite using the singular term "defendants,"
23 we should not read that as referring to all
24 defendants, correct?

25 MR. SOBOL: Objection.

1 A. In this paragraph in
2 particular, I'm talking about the defendants
3 who have detailing that I'm measuring in my
4 data, so those would be the marketing
5 defendants.

6 BY MR. METZ:

7 Q. Okay. And by marketing
8 defendants, you're not including any of the
9 distributor defendants, correct?

10 A. I don't believe that they have
11 marketing data in my data, so there may be
12 places in my report where I refer to
13 defendants where it's appropriate to talk
14 about them more generally, for example, when
15 I'm summarizing the complaint, but here I
16 intend to describe the defendants who have
17 detailing that is measured in the IQVIA data.

18 Q. Okay. So just to be clear,
19 not -- as you believe it, not -- that does
20 not include the distributor defendants,
21 correct?

22 MR. SOBOL: Objection, asked
23 and answered.

24 A. I believe that is true.

25 ///

1 BY MR. METZ:

2 Q. Okay. And it also does not
3 include the pharmacy defendants, correct?

4 MR. SOBOL: Objection, asked
5 and answered.

6 A. Yes, that is correct.

7 BY MR. METZ:

8 Q. So we take another example,
9 paragraph 78, where you say, quote: An
10 alternative method of identifying the impact
11 of the defendants', possessive, misconduct,
12 is to use an indirect method.

13 Do you see that?

14 A. Yes.

15 Q. And there again, you're using
16 the term "defendants," but how we should
17 understand that is the marketing defendants,
18 correct?

19 A. Well, the -- in -- excuse me,
20 the indirect approach -- it is getting to be
21 late -- is, as you know, a residual approach,
22 so it inherently is looking at all of these
23 demographic, socioeconomic and healthcare
24 factors that could have driven higher opioid
25 use and attributes that which is left to the

1 misconduct.

2 I think it's a little bit less
3 clear about how that analysis might be used
4 to assess liability for distributors. I have
5 not been asked to do that, but the indirect
6 analysis, because it's not measuring the
7 conduct of a specific group, could be open to
8 a broader interpretation.

9 Q. Have you disclosed any opinions
10 that, based upon your indirect model, you
11 draw conclusions about distributor
12 defendants' conduct?

13 A. I have not. I have not drawn
14 those conclusions.

15 Q. And you mentioned the detailing
16 data, but just to be clear, you did not
17 include in your direct model any data series
18 that you understood were measuring the
19 conduct of the distributor defendants; is
20 that correct?

21 MR. SOBOL: Objection, asked
22 and answered.

23 A. I have not measured the conduct
24 of the distributors or included that in my
25 model.

1 BY MR. METZ:

2 Q. And the same would be true of
3 the pharmacy defendants, correct?

4 MR. SOBOL: Objection, asked
5 and answered.

6 A. I have not measured the conduct
7 of the pharmacies and included that in my
8 models.

9 MR. METZ: Just so it's not
10 recurring, I'm five questions in.
11 What have I asked and answered? Or
12 what have I asked previously?

13 MR. SOBOL: All of this was
14 covered by Mr. Roth this morning and
15 yesterday.

16 MR. METZ: Okay. I disagree.

17 BY MR. METZ:

18 Q. You testified at several points
19 that the design of your model is intended to
20 capture an aggregate effect on MMEs sold,
21 correct?

22 A. That's correct.

23 Q. And in part what that means is
24 you've not reported your results in a way
25 that allows you to identify any particular

1 set of prescriptions that combine to make up
2 the additional MMEs you've identified in your
3 analysis, correct?

4 A. The way my analysis works is to
5 analyze the actual data and identify a
6 quantity of prescriptions in aggregate that
7 would not have been filled absent the
8 promotional misconduct.

9 As I noted yesterday, because
10 the but-for scenario did not occur, we cannot
11 explicitly observe which individual
12 prescriptions would not have been filled. So
13 there's a conceptual impossibility to the
14 statement that you're describing.

15 Q. Okay. So just to be clear,
16 your answer is yes, but for the reason that
17 it would be impossible?

18 MR. SOBOL: Objection, asked
19 and answered.

20 A. Yes, and my analysis -- as you
21 know, my assignment was to estimate the
22 impact of the alleged misconduct and to
23 quantify that in aggregate.

24 BY MR. METZ:

25 Q. I understand. The alleged

1 marketing misconduct, correct?

2 A. The alleged marketing
3 misconduct.

4 Q. And am I correct that the data
5 that you use in your calculation does not
6 contain identifying information for
7 individual prescriptions, correct?

8 A. My data do not contain
9 individual prescription identifiers. I
10 assume by that you mean something like a
11 member identifier.

12 Q. Anything that would enable you
13 to identify a specific prescription that's
14 within the sum of your conclusions?

15 A. No. Again, because of -- for
16 privacy reasons, my data are deidentified.

17 Q. Okay. Now, you testified
18 yesterday that you have not formed any
19 opinions about the separate role of doctors
20 in causing an increase in the MMEs that you
21 measured.

22 Do you recall that testimony?

23 A. I believe I described the fact
24 that of course doctors are in the causal
25 chain, they're the ones writing the

1 prescriptions.

2 Q. Right. You testified that
3 the conduct you're attempting to measure
4 flows through doctors, but you're not forming
5 a separate opinion about their independent
6 role in the causal chain, what influence they
7 exerted in the causal chain, correct?

8 MR. SOBOL: Objection.

9 A. I have not separately examined,
10 I guess, doctor behavior. Again, because
11 it's tautologically true that every
12 prescription is written by a physician, I
13 struggle with that concept.

14 BY MR. METZ:

15 Q. I understand.

16 Now, you also testified
17 yesterday that you've not formed any opinions
18 about whether any quantity of the increase in
19 MMEs identified in your opinions was
20 medically necessary or unnecessary, correct?

21 MR. SOBOL: Objection. On the
22 direct model, you mean?

23 BY MR. METZ:

24 Q. On the direct model, do you
25 recall that testimony?

1 A. Yes. In the direct and
2 indirect models, I do not differentiate
3 between medically necessary and unnecessary
4 prescriptions.

5 Q. Okay. And in part what that
6 means is you have not endeavored to identify
7 any subset of your total measured MME
8 increase that consists of prescriptions that
9 do not meet an appropriate standard of
10 medical care; is that correct?

11 MR. SOBOL: Objection, asked
12 and answered.

13 A. I have not evaluated the -- nor
14 am I a clinical expert, just to be clear --
15 the medical necessity of any of the
16 prescriptions that I find were caused by the
17 alleged misconduct.

18 BY MR. METZ:

19 Q. Right. You've not done that at
20 the level of individual prescriptions in the
21 first instance, correct?

22 MR. SOBOL: Objection, asked
23 and answered.

24 A. I have not done analysis at the
25 level of individual prescriptions at all.

1 BY MR. METZ:

2 Q. Okay. And you've not done that
3 for an aggregate sum of prescriptions either,
4 correct?

5 MR. SOBOL: Objection, asked
6 and answered.

7 A. I have not evaluated medical
8 necessity of any prescriptions.

9 BY MR. METZ:

10 Q. All right. Am I correct that
11 you've also not undertaken to identify any
12 subset of your total MME increase that
13 consists of prescriptions a pharmacist should
14 have refused to fill for whatever reason
15 after it was presented by a patient?

16 MR. SOBOL: Objection.

17 A. I have not been asked to
18 examine the decisions of pharmacists or the
19 conduct of pharmacists as it relates to this
20 matter.

21 BY MR. METZ:

22 Q. Okay. So you've not done that
23 for the reason you just stated?

24 MR. SOBOL: Objection, asked
25 and answered.

1 A. I have not examined the conduct
2 of pharmacists.

3 BY MR. METZ:

4 Q. Okay. And you're not an expert
5 in what constitutes responsible conduct of
6 pharmacists, correct?

7 A. I'm not an expert in what
8 constitutes responsible conduct for
9 pharmacists.

10 Q. Based on your role as a
11 healthcare economist, are you, though,
12 generally aware that pharmacists have certain
13 obligations relating to the dispensing of
14 pharmaceuticals?

15 A. I am aware generally where
16 pharmacists fit in the supply chain. I am
17 not familiar with the specifics of their
18 professional guidelines.

19 Q. Okay. And recognizing that
20 you've already told me you do not have the
21 expertise to do this, it was not your
22 assignment, and you do not have the
23 visibility at the prescription level -- I
24 just want to confirm for the record -- you
25 have not evaluated whether individual

1 prescriptions that are somehow within your
2 total MME calculation were properly filled
3 from the perspective of a pharmacist?

4 MR. SOBOL: Objection.

5 Objection, asked and answered.

6 A. I have not evaluated -- I guess
7 it sounds to me like you're just saying that
8 there's a notion of medical necessity that
9 applies to pharmacists, but I have not
10 evaluated the medical circumstances around a
11 particular prescription, whether it pertains
12 to the doctor's decisions or the pharmacist's
13 decisions.

14 BY MR. METZ:

15 Q. Thank you for that. And just
16 to be clear, because that's not what I was,
17 in fact, suggesting, I'm just trying to
18 confirm what is not done within the contours
19 of your opinions, not necessarily the reasons
20 for them or suggesting that you should have
21 done these things.

22 MR. SOBOL: Well, she's going
23 to give complete answers to the
24 questions.

25 MR. METZ: I don't mind her

1 giving complete answers.

2 MR. SOBOL: Okay.

3 BY MR. METZ:

4 Q. You similarly have not -- it
5 follows, I think, by not having done that
6 analysis at the level of individual
7 prescriptions, you've also not evaluated
8 whether individual pharmacists improperly
9 dispensed in response to prescriptions they
10 were presented with, correct?

11 MR. SOBOL: Objection, asked
12 and answered.

13 A. I have not evaluated the
14 conduct of individual pharmacists in my
15 analysis.

16 BY MR. METZ:

17 Q. Okay. And you've not
18 undertaken such an evaluation at the level of
19 pharmacies as a whole, correct?

20 MR. SOBOL: Objection, asked
21 and answered.

22 A. I have not evaluated the
23 contribution of pharmacies to these
24 prescriptions.

25 ///

1 BY MR. METZ:

2 Q. And you've not evaluated that
3 at the level of chains of pharmacies,
4 correct?

5 MR. SOBOL: Objection, asked
6 and answered.

7 A. I have not evaluated the
8 conduct of pharmaceutical chains or pharmacy
9 chains to the opioid prescriptions.

10 BY MR. METZ:

11 Q. Now, in Table 2 of your report,
12 you disclose some information on a percentage
13 basis under a heading that it is the percent
14 of MMEs attributable to challenged promotion,
15 correct?

16 A. I think that's right. I'm
17 sorry, just let me get the table. Percent of
18 MMEs attributable to challenged promotion,
19 yes.

20 Q. Okay. Now, would I be correct
21 in surmising that for all the reasons we've
22 been discussing, it would not be correct to
23 characterize the results reflected in Table 2
24 as reflecting a percentage of MMEs prescribed
25 in excess of legitimate medical need?

1 MR. SOBOL: Objection, asked
2 and answered.

3 A. It is -- I do not describe my
4 calculations that way, and as we discussed
5 earlier, I have not evaluated the medical
6 necessity of any prescriptions.

7 BY MR. METZ:

8 Q. Okay. My question was close to
9 that, but it's not that.

10 They're not described that way,
11 and it would be incorrect to describe them
12 that way based on the analysis you conducted,
13 correct?

14 MR. SOBOL: Objection, form,
15 asked and answered.

16 A. I did not analyze medical
17 necessity. My results do not pertain to
18 medical necessity and, like anything, they
19 are not, it would be incorrect to label them
20 medical necessity or anything else that they
21 are not.

22 BY MR. METZ:

23 Q. Thank you.

24 You would also agree with me
25 that again, for the same reasons we've been

1 discussing, it would not be correct to
2 characterize Table 2 as reflecting a percent
3 of MMEs dispensed by pharmacies or
4 pharmacists in excess of legitimate
5 prescriptions?

6 MR. SOBOL: Objection, asked
7 and answered.

8 A. I am not sure whether --
9 because I have not analyzed the conduct of
10 pharmacists or pharmacies -- whether another
11 expert might deem these same units that I
12 calculate are caused by promotion to have
13 been in excess from the point of view of the
14 conduct of pharmacists or pharmacies.

15 I have not done that analysis.
16 So you're asking me a question about how
17 these -- these analyses might be used by
18 others, as far as I'm concerned.

19 BY MR. METZ:

20 Q. I'm asking the author of the
21 analysis the proper interpretation of the
22 analysis, and as the author of the analysis,
23 it would not be a proper interpretation that
24 what this reflects is a quantity of opioid
25 pharmaceuticals dispensed in excess of

1 legitimate prescriptions, correct?

2 MR. SOBOL: Objection, asked
3 and answered, mischaracterizes prior
4 testimony.

5 A. When you use the word
6 "legitimate," to me that sounds like it -- I
7 mean, literally it's a legal term, and so
8 what I've calculated here, which I have
9 labeled absolutely clearly, is the percent of
10 MMEs attributable to allegedly unlawful -- I
11 say challenged -- unlawful promotion.

12 So that is illegitimate in a
13 sense, in the sense that I understand
14 plaintiffs' counsel intend to prove that the
15 defendants' promotion from 1995 through 2018
16 was unlawful.

17 BY MR. METZ:

18 Q. Okay. Let me ask it in a
19 different way.

20 The information compiled in
21 Table 2 could not be correctly characterized
22 as having been compiled so that it would show
23 an amount of opioid prescriptions that were
24 dispensed based on prescriptions a pharmacist
25 should have refused?

1 MR. SOBOL: Objection.

2 BY MR. METZ:

3 Q. That's not the basis on which
4 Table 2 is compiled, correct, as its author?

5 MR. SOBOL: Objection, asked
6 and answered several times now.

7 A. I have not in my analysis
8 analyzed the behavior of pharmacies or
9 pharmacists, and so I cannot describe these
10 data as reflecting the behavior of pharmacies
11 or pharmacists.

12 Because of this issue around
13 the causal chain that pharmacies, in fact,
14 dispense prescriptions, I don't know if
15 someone else would attribute this -- these
16 same excess units to pharmacies. I haven't
17 done that analysis.

18 I am not attributing these to
19 pharmacists' behavior, but they are in the
20 causal chain. So I'm saying I have described
21 these as those units that are caused by the
22 allegedly unlawful promotion. That's what
23 they are.

24 Whether or not the pharmacists'
25 or pharmacies' conduct is fully overlapping

1 with the marketing manufacturers here, I
2 don't know. I haven't been asked to look at
3 that question.

4 BY MR. METZ:

5 Q. In running the analyses that
6 resulted in the numbers in Table 2, it was
7 never at any point your intention to compile
8 a table from which one would interpret that
9 as a volume of opioid prescriptions that were
10 dispensed in excess of legitimate --
11 prescriptions that a pharmacist should have
12 fulfilled after being presented with such
13 prescriptions.

14 MR. SOBOL: Objection, asked
15 and answered, mischaracterizes prior
16 testimony.

17 BY MR. METZ:

18 Q. Isn't that correct?

19 MR. SOBOL: Well, objection.
20 Answer -- asked and answered,
21 mischaracterizes prior testimony.

22 If you want to give the same
23 answer or whatever, go ahead.

24 A. I'm not sure. In my analysis,
25 I did not consider whether a pharmacist or

1 pharmacy should have done one thing or
2 another. Again, they're in the causal chain.
3 They must have been involved in filling these
4 prescriptions, but I have not separately
5 analyzed the conduct of those pharmacists or
6 pharmacies; and moreover, when you use the
7 word "should," that sounds like there's
8 either a professional judgment or a legal
9 judgment, and I have not analyzed that kind
10 of judgment.

11 BY MR. METZ:

12 Q. Okay. I think I asked a
13 complicated question, more so than I intended
14 to be. Mine is just very simple.

15 As the person who compiled the
16 information in that table, it was not done
17 for the purpose of making the sort of claim
18 that I just -- just stated in my previous
19 question, correct? That was not the purpose
20 of compiling the information in that table.

21 MR. SOBOL: Objection, asked
22 and answered.

23 A. The purpose of Table 2 was to
24 fulfill the part of my assignment where I was
25 asked to quantify the impact of allegedly

1 unlawful promotion on MMEs. That was the
2 purpose of Table 2.

3 BY MR. METZ:

4 Q. Okay. Now, you testified this
5 morning that you've not conducted any
6 analyses relating to suspicious order
7 monitoring for any defendant.

8 Do you recall that?

9 MR. SOBOL: Objection, asked
10 and answered.

11 A. Yes.

12 BY MR. METZ:

13 Q. To take that one step further,
14 you conducted no analysis seeking to identify
15 any subset of your total MMEs increase that
16 consists of opioid medications that were part
17 of any order that plaintiffs or their experts
18 have alleged to be suspicious. You've not
19 conducted that analysis, correct?

20 A. I have not conducted an
21 analysis of suspicious orders in -- within
22 the context of my analysis and any suspicious
23 order analysis.

24 Q. And as we discussed a few
25 minutes ago, because your results are based

1 on aggregate data for total MMEs, they do not
2 contain the identifying information that
3 would allow you to trace them back to
4 individual prescriptions, correct?

5 MR. SOBOL: Objection, asked
6 and answered.

7 A. The data I have from the
8 National Prescription Audit do not have
9 identifiers, so in these data, I cannot trace
10 them back to individuals.

11 BY MR. METZ:

12 Q. Okay. And therefore, those
13 MMEs are also not traceable back to
14 individual pharmacies, correct?

15 MR. SOBOL: Objection, asked
16 and answered.

17 A. Again, in the aggregate data I
18 have, that is correct.

19 BY MR. METZ:

20 Q. And you've not attempted to
21 trace them, correct?

22 MR. SOBOL: Objection, asked
23 and answered.

24 A. I would have to get a different
25 dataset for that.

1 BY MR. METZ:

2 Q. Okay. And therefore, those
3 MMEs are also not traceable back to
4 individual orders that pharmacies placed with
5 their wholesale distributors, correct?

6 MR. SOBOL: Objection, asked
7 and answered.

8 A. My data are not at the right
9 level of disaggregation to track orders to or
10 from pharmacies.

11 BY MR. METZ:

12 Q. And for that reason or other
13 reasons, you've not attempted to make any
14 such linkage, correct?

15 MR. SOBOL: Objection, asked
16 and answered.

17 A. I have not been asked to make
18 any such linkage, and so, therefore, I have
19 not acquired the data or undertaken that
20 assignment.

21 BY MR. METZ:

22 Q. And for that reason, if not
23 others, would you agree with me that it would
24 not be correct to characterize Table 2 as
25 reflecting a percentage of MMEs distributed

1 as a result of suspicious orders?

2 MR. SOBOL: Objection.

3 A. These are -- oh, as a result of
4 suspicious orders, sorry. It is -- these are
5 a percentage of MMEs that were distributed as
6 it were. They reached patients at a pharmacy
7 as a result of promotional misconduct. I
8 have not analyzed suspicious orders. I do
9 not know how those two things would
10 intersect. These percentages reflect
11 promotional impact.

12 MR. METZ: Thank you. Whoever
13 is on the phone, if you would hit
14 mute, please. We're hearing some
15 background. Thank you.

16 BY MR. METZ:

17 Q. Would you agree with me that as
18 a general proposition, in a regression
19 analysis, causality cannot be inferred by
20 data analysis alone, rather, one must infer
21 that the causal relationship exists on the
22 basis of an underlying causal theory that
23 explains the relationship between the two
24 variables?

25 A. It sounds like you're reading

1 from a textbook. Generally, causation begins
2 with an economic theory. I would agree with
3 the general premise of that statement.

4 Q. And would you also agree that
5 as a general proposition in regression
6 analysis, even when an appropriate theory has
7 been identified, causality can never be
8 inferred directly; one must also look for
9 empirical evidence that there is a causal
10 relationship?

11 MR. SOBOL: Objection, asked
12 and answered.

13 A. I would agree that in general,
14 economists use both theory and empirical
15 evidence to make causal inferences, yes.

16 BY MR. METZ:

17 Q. And consistent with those
18 principles for your work in this matter, you
19 have not posited a causal theory of how your
20 calculation of the increase in total MMEs
21 might be causally related to any alleged
22 suspicious order by distributor defendants,
23 correct?

24 A. I have not posited a theory
25 related to suspicious orders. I have not

1 been asked to examine that question in any
2 way in my analysis.

3 Q. And it follows you've also not
4 looked for empirical evidence of any such
5 causal relationship, correct?

6 MR. SOBOL: Objection, asked
7 and answered.

8 A. Yes, I have not -- I have not
9 undertaken an analysis of suspicious orders.
10 BY MR. METZ:

11 Q. Okay. New topic.

12 In paragraph 56 of your report,
13 you -- and I'm reading a truncated version of
14 the quote, but, quote: While documents
15 produced in discovery show many --

16 MR. SOBOL: Wait one second,
17 please, if it's going to be truncated.

18 MR. METZ: Please.

19 A. 56? Yeah.

20 MR. SOBOL: Where are you?

21 THE WITNESS: At the bottom of
22 page 38?

23 MR. METZ: I believe so.

24 THE WITNESS: Yes.

25 ///

1 BY MR. METZ:

2 Q. You state: While documents
3 produced in discovery show many examples of
4 such promotional efforts beyond detailing,
5 for the purposes of my econometric analysis,
6 I rely on detailing contacts to measure
7 promotion for several reasons.

8 Do you see that?

9 A. I do.

10 Q. Okay. Now, you testified about
11 this yesterday, but I have a few follow-up
12 questions.

13 A. Sure.

14 Q. As I understand your testimony
15 and your report, one reason you rely upon
16 detailing is that it's a form of marketing
17 for which you have enough data to enable you
18 to perform a time series regression; is that
19 correct?

20 MR. SOBOL: Objection.

21 A. That is one of the reasons that
22 I state in this paragraph, in addition and
23 first and foremost, to it being a very
24 important form of marketing, if not the
25 dominant form of marketing.

1 BY MR. METZ:

2 Q. Okay. So some of the other
3 forms of marketing are not systematically
4 tracked in data in the same way that the
5 detailing is, correct?

6 A. Yes, that's correct.

7 Q. And you also believe, do you
8 not, that -- this is a quote: From an
9 econometric standpoint, detailing is a good
10 proxy for total promotional effort,
11 including -- and closed quote -- including
12 those other forms of marketing for which
13 there's not systematic data, correct?

14 A. Yes, that's correct.

15 Q. All right. Now, in the
16 following paragraph, paragraph 57, and then
17 in Figure 5, you identify a series of what
18 are labeled key events that would have
19 affected the receptiveness of prescribers and
20 patients to promotional messages about the
21 safety and effectiveness of opioids.

22 Do you see that?

23 A. I do.

24 Q. Okay. And your understanding
25 is plaintiffs allege that manufacturer

1 defendants were responsible for those key
2 events?

3 A. As you can see, looking at
4 Figure 5, the events in red include many
5 policy/regulatory events, so the events in
6 green are ones that are described in
7 Dr. Perri's report, among other places.

8 Q. Okay. So the answer to my
9 question would be yes, for the green-flagged
10 key events?

11 A. Yes.

12 Q. How did you --

13 MR. SOBOL: Or the answer she
14 gave.

15 BY MR. METZ:

16 Q. How did you identify this list
17 of key events?

18 A. The list comes from -- there's
19 an FDA timeline that's available on their
20 website that is included in my documents
21 relied upon; the complaint, Dr. Perri's
22 report. It's an aggregation of all those
23 places.

24 Q. Okay. Did you include every
25 event that's listed in those sources?

1 A. No, I did not.

2 Q. With reference to the events
3 flagged in green, what were your criteria for
4 inclusion from among the various events that
5 were candidates based on those sources?

6 A. Sure. Again, as I said earlier
7 yesterday, I believe, I sought to describe
8 some of the key events that were going on at
9 different stages of the analysis during the
10 time frame, so I was looking to identify
11 events over time.

12 In some cases there might be
13 other events that coincide with these same
14 events. I focused in terms of the events in
15 green in particular ones that are highlighted
16 in the complaint and in Dr. Perri's report.

17 Q. Now, in your testimony
18 yesterday, you were asked about one of these
19 events. It was the consensus statement of
20 the American Academy of Pain Management and
21 the American Pain Society.

22 A. Yes.

23 Q. Do you recall that?

24 A. I do.

25 Q. And I want to ask a little

1 follow-up about your testimony which, based
2 on the rough transcript, was in part that
3 that consensus statement related to the
4 undertreatment of pain and the need for more
5 attention to the treatment of pain and the
6 effective use of opioids for such treatment.

7 Do you recall that?

8 A. Yes, that was my summary of it.

9 Q. And why would that make that
10 event significant?

11 A. I don't know what you mean by
12 why would that summary make it significant.
13 Again, it's an event that's talked about in
14 Dr. Perri's report and talked about in the
15 complaint.

16 Q. This is a -- this is an event
17 that, based on the information referred to in
18 those places, you were hypothesizing could
19 have had a causal relationship with the sales
20 of MMEs, correct?

21 A. That's right. I understand
22 that Dr. Perri's opinion and plaintiffs
23 intend to prove that these kinds of
24 professional society recommendations were
25 manipulated by defendants.

1 Q. Okay. And one of the reasons
2 why that statement as you described it
3 yesterday would be hypothesized to have a
4 causal influence is it referred to the notion
5 that there's an undertreatment of pain,
6 correct?

7 A. Yes.

8 Q. And another of the reasons was
9 because it referred to the notion that
10 opioids could be effective treatment for such
11 pain, correct?

12 A. That's correct.

13 Q. Does the reputation of these
14 two bodies play a role in its being
15 considered a key event?

16 A. Again, for my purposes, it's a
17 notable event because it is featured in
18 Dr. Perri's analysis and others, and I'm
19 using Figure 5 to talk about particularly the
20 nonmarketing mechanisms that were allegedly
21 part of the overall effort to grow the market
22 for opioids.

23 So the reputation of the
24 professional societies is likely a reason for
25 which the marketing defendants allegedly

1 influenced those -- that consensus statement
2 and those guidelines because that is an
3 effective way of delivering their message.

4 Q. Now, looking again at Figure 5,
5 I see you have it in front of you, another of
6 the key events that's flagged reads capital
7 V, cap A, "Pain as 5th Vital Sign."

8 Do you see that?

9 A. I do.

10 Q. Do you have an understanding of
11 what that's referring to?

12 A. It was a VA statement, again,
13 around the need to more closely monitor and
14 treat pain.

15 Q. And the VA that you're
16 referencing there is the U.S. Department of
17 Veteran Affairs?

18 A. It is.

19 Q. And why would that be
20 significant?

21 A. Again, this is something that
22 is described in Dr. Perri's report and is
23 another example of the way defendants'
24 message was legitimized through the
25 activities of other stakeholder groups,

1 including the VA.

2 Q. Okay. And as you say
3 "defendants" in that testimony, you mean
4 marketing defendants?

5 A. Yes, marketing defendants.

6 Q. Do you recall anything else
7 about the VA's message other than it was
8 around a need to more closely monitor and
9 treat pain?

10 A. I don't recall all the details
11 of it. I believe it's cited in my documents,
12 so we could pull it up.

13 Q. Okay. But it is, as you recall
14 it, thematically consistent with the previous
15 document in that it identified a need to have
16 more expansive treatment of pain and
17 identified opioids as one way of doing that?

18 A. Yes. And I think what it
19 became known for was this notion of the fifth
20 vital sign.

21 Q. That pain is the fifth vital
22 sign?

23 A. That's correct.

24 Q. Okay. And again, in the
25 language we were referring to a few minutes

1 before, you had a causal theory that a
2 publication like that by an organization like
3 the VA could have been causally related to
4 the sale of opioids, correct?

5 A. Yes. I believe that's what I
6 describe in my report, that all of these
7 events collectively created an environment in
8 which physicians were more receptive to
9 pharmaceutical marketing.

10 Q. And because it's flagged in
11 green, the causal theory is that it would be
12 positively correlated with sales, correct?

13 A. That was my causal theory, yes.

14 Q. And so can we look at Table 1
15 in your report, which is the --

16 A. Regression results.

17 Q. Well, it's the output from your
18 direct regression.

19 A. Yes.

20 MR. SOBOL: Do you have a page?

21 MR. METZ: I do.

22 THE WITNESS: 47.

23 MR. SOBOL: Thank you.

24 BY MR. METZ:

25 Q. And you testified about this

1 yesterday and over the course of today, and
2 I'm just going to reference a couple of
3 things to orient us and then I have some
4 follow-up questions.

5 In your Model B, as you've
6 testified, you do not include a variable for
7 marketing conduct other than -- other than
8 detailing; isn't that correct?

9 A. The variable that I included in
10 my model is detailing, the stock of
11 detailing, yes.

12 Q. Okay. And your findings based
13 on that model purport to explain more than
14 99% of the variation in total MMEs, correct?

15 A. Based on this model, which also
16 includes the price index, yes.

17 Q. Okay. And that 99% is based on
18 the R-squared statistic, correct?

19 A. Yes.

20 Q. And then in your Model C, you
21 include five additional dummy variables to
22 test for whether specific events from your
23 Figure 5 are having an influence on total
24 MMEs, correct?

25 A. That's correct.

1 Q. And you talk about that a
2 little in paragraph 73 of your report?

3 A. Yes.

4 Q. And in -- as you disclose
5 there, in your -- and as reflected, I think,
6 in Table 1, when you ran the model, including
7 those five dummy variables, you found that
8 two of them were statistically significant at
9 the 5% level, correct?

10 A. That's correct.

11 Q. One is what you've titled the
12 1999 Federation of State Medical Boards Model
13 Guidelines dummy variable, correct?

14 A. Yes.

15 Q. And the other is the
16 rescheduling of hydrocodone, correct?

17 A. That's correct.

18 Q. Now, you've assigned names to
19 these dummy variables, but wouldn't you agree
20 that by definition, a dummy variable is not
21 actually testing for the influence of the
22 specific event described in its name?

23 MR. SOBOL: Objection.

24 A. Well, I'm not sure I would
25 agree with that. They're intended to capture

1 an event based on their timing. They are
2 not -- they don't reflect a quantum, other
3 than existence, and so hence, the name dummy
4 variable.

5 BY MR. METZ:

6 Q. Okay.

7 A. But they are still intended to
8 capture some kind of timing.

9 Q. They're intended to capture
10 the -- an effect that's occurring with that
11 time and an effect that may be correlated
12 with the variable of interest, correct?

13 A. Yes, an effect on the variable
14 of interest.

15 Q. Okay. And so it's in contrast
16 with, for example, your detailing data, which
17 is populated by data that changes month to
18 month. A dummy variable, especially as
19 you've used it, has two settings, correct?

20 A. A dummy variable, as anyone
21 would use it, as it's defined, is either a
22 one or a zero. They're very commonly used in
23 regression analysis, as you may know.

24 Q. I know.

25 And so -- and you described

1 this in paragraph 73. In your model you have
2 a series of months where the dummy variable's
3 value or the value of the data associated
4 with it is zero, correct?

5 A. That's correct.

6 Q. And at a point in time that you
7 determine for purposes of trying to capture
8 the effects of some event of interest, you
9 changed that value from zero to one, correct?

10 A. That's correct.

11 Q. And in your model you leave it
12 turned on as it were --

13 A. Yes.

14 Q. -- from then to the end of your
15 data series, correct?

16 A. True.

17 Q. And that's not an automatic
18 design feature one could turn a dummy
19 variable on and off, correct?

20 A. You can do whatever you like,
21 of course, but for the most part, when we
22 think about something that is released, that
23 it's on and that it stays on. Unless, for
24 example, there was a policy that was then
25 reversed and then it would make sense to turn

1 it off.

2 Q. Right. So I understand that
3 you selected the timing of these dummy
4 variables based on their proximity to the
5 events after which they're named, correct?

6 A. Yes.

7 Q. But to be precise, regardless
8 of the names, what they're capturing are
9 changes in the dependent variable, which in
10 this case are the total MMEs, that are
11 correlated with influences existing at the
12 time the dummy variable is turned on,
13 correct?

14 MR. SOBOL: Objection, form.

15 A. Yes, they are capturing any
16 shift that occurred around that time.

17 BY MR. METZ:

18 Q. And if there are multiple
19 events around that same time that are
20 correlated with the explanatory variable in a
21 similar way, the dummy variable will pick up
22 their collective influence, correct?

23 A. Yes. I believe I said the same
24 thing when I explained why ultimately I do
25 not use Model C.

1 Q. And you originally created
2 Model C as a robustness test, correct?

3 A. It is a check on Model B to
4 see, well, we had these events, if we picked
5 the ones that we think are important, do we
6 see any shift around that time period.

7 So it's a check in that sense,
8 and it seems to me based on the results that
9 it's not a sensible direction to go.

10 Q. Well, maybe my question is
11 meant to be -- I meant it to be a little bit
12 simpler.

13 You designed Model C as a test
14 of the robustness of Model B, rather than
15 running that as a fully formed model. Isn't
16 that what you say in your report?

17 MR. SOBOL: Objection, asked
18 and answered.

19 A. I describe it in that way as
20 well, and in doing so, I look at Model C on
21 its own merits as well.

22 BY MR. METZ:

23 Q. Okay. And the purpose -- so
24 leaving aside your valuation of the merits of
25 Model C on its own, I want to focus on the

1 robustness test purpose.

2 The purpose of a robustness
3 test is to see the extent to which the
4 results of a regression model are sensitive
5 to changes in the underlying assumptions of
6 that model; is that correct?

7 A. Yes.

8 Q. And you agree that robustness
9 is important to the validity of a regression
10 model and its interpreted results?

11 MR. SOBOL: Objection, form.

12 A. It's one way that we look at
13 the validity of the model.

14 BY MR. METZ:

15 Q. And so specifically here, to
16 the extent your purpose was a robustness
17 test, you were testing the assumption -- and
18 I'm quoting again from paragraph 73 -- the
19 validity of the assumption that, quote,
20 Model B implicitly accounts for non-detailing
21 events and policies, closed quote, correct?

22 A. Yes.

23 Q. And you tested that by
24 examining whether indicators of specific
25 events and policies should be explicitly

1 included in the model, correct?

2 A. Yes.

3 Q. Now, when you originally
4 disclosed your report, you concluded that
5 jointly all five events are not statistically
6 different from zero, correct?

7 MR. SOBOL: Objection.

8 A. Yes, that was -- it was -- the
9 wrong test was referenced when the write-up
10 was, although the right test was included in
11 the results, but I was looking at the wrong
12 test when I summarized that.

13 BY MR. METZ:

14 Q. Okay. And so just to hone in
15 on the particular language that's used in
16 your report, when you say jointly, all five
17 events are not statistically different from
18 zero, based on the discussion we had a minute
19 ago, you mean the five dummy variables named
20 after events as listed in Table 1 were not
21 statistically different from zero as stated
22 in your report originally?

23 MR. SOBOL: Objection. Well,
24 you want her to testify on the basis
25 before the errata?

1 MR. METZ: I'd like her to
2 answer my question. But she's doing a
3 fine job. If you don't understand my
4 question, I'm happy to clarify.

5 A. No, I think you just said
6 something that would be -- I understand is
7 accessible, but it would be a strange way to
8 describe the results.

9 So I say that the dummies are
10 or aren't significant, so I'm inferring from
11 the dummy variables what I can learn about
12 modeling those events in that on/off way.

13 BY MR. METZ:

14 Q. Well, if I -- if we took the
15 sentence that's in your report that I quoted,
16 the one beginning "jointly," and replaced the
17 word "events" with "dummies," would it cease
18 to be accurate?

19 A. It would not. I'm just saying
20 it would not be unusual for someone to
21 describe their statistical results using
22 dummy variables based on what the dummy
23 variables are intended to represent.

24 Q. Okay. And one of the reasons
25 you've given for rejecting Model C was you

1 found a counterintuitive result for your
2 hydrocodone event, correct?

3 MR. SOBOL: Objection.

4 A. I gave that reason in addition
5 to the fact that it does not fundamentally
6 change my results.

7 BY MR. METZ:

8 Q. Okay. But that was one of your
9 reasons?

10 A. That's correct.

11 Q. And because it's a dummy
12 variable, that result may not be
13 counterintuitive. It may be capturing an
14 effect other than hydrocodone, correct?

15 MR. SOBOL: Objection.

16 A. Again, it's counterintuitive
17 based on the event I put the dummy variable
18 in to model, and like you, I wonder if it's
19 capturing something else.

20 BY MR. METZ:

21 Q. Okay. It would be contrary to
22 your expectations for why you put a dummy
23 there in the first place and why you named it
24 the way you did. But that doesn't rule out
25 that it's accurately measuring some event

1 that's actually going on at that place, just
2 not one that you had hypothesized?

3 MR. SOBOL: Objection, form,
4 asked and answered.

5 A. Yes, it is possible that it is
6 appropriately capturing something.

7 BY MR. METZ:

8 Q. Okay. And that was one of two
9 events that you found that individually was
10 statistically significant at the 5% level,
11 correct?

12 A. That's correct.

13 Q. And you also, as you now
14 disclosed in your errata, you also found that
15 jointly, all five events are statistically
16 different from zero, correct?

17 A. That's correct.

18 Q. Okay. And returning to the
19 robustness test purpose of creating Model C
20 in the first place, that shows, does it not,
21 that your Model B is sensitive to some events
22 outside the construct of Model B that are
23 being captured by those dummy variables?

24 MR. SOBOL: Objection.

25 A. I would disagree. If you

1 look -- if we go to look at the charts and
2 you look at the extent to which my
3 predictions changed, they hardly change at
4 all. The coefficients on the variables of
5 interest, they hardly change at all.

6 BY MR. METZ:

7 Q. Well --

8 A. The results are virtually the
9 same.

10 Q. Your coefficient for -- you
11 have three time period coefficients for the
12 detailing variable, correct?

13 A. That's correct.

14 Q. And as you've discussed, you
15 also construct the detailing variable
16 differently in the different periods,
17 correct?

18 A. We discussed that. We can go
19 over it again, but yes.

20 Q. I'm just referencing that.

21 A. Yes, let's reference that.

22 Q. All right. The first time
23 period detailing variable changes from
24 Model B to Model C, does it not?

25 A. It changes a small bit, but

1 again, if you look at the predictions of
2 actual versus but-for, the differences are
3 minute.

4 Q. I'll get to that in a second.
5 It changes, yes?

6 MR. SOBOL: Well, no,
7 objection. She answered the question.

8 MR. METZ: Fair enough.

9 THE WITNESS: In my opinion --
10 BY MR. METZ:

11 Q. I'll ask a different question.

12 A. Okay.

13 Q. Specifically, it changed by
14 reporting a lower value in Model C for that
15 coefficient as compared to Model B.

16 MR. SOBOL: Objection, asked
17 and answered.

18 A. The coefficient is lower, yes.

19 BY MR. METZ:

20 Q. And the interpretation of that
21 is that in that Model C, when you include
22 these dummy variables, some amount of the --
23 what had previously been reported as the
24 influence of the detailing is now being no
25 longer reported as the influence of the

1 detailing, and it is being ascribed to one or
2 more of the dummy variables. Yes?

3 MR. SOBOL: Objection.

4 A. There is some quantum. It is a
5 very small difference. In my view, given the
6 limitations of Model C and given the fact the
7 results are different by such a small amount,
8 Model B is preferred.

9 BY MR. METZ:

10 Q. Okay. And you have a second
11 period in which you report the detailing
12 variable, and the coefficient on that
13 variable also changes from Model B to
14 Model C, correct?

15 A. Yes, they do. The point
16 estimates are different.

17 Q. Okay. And they change in the
18 same direction in that, again, the detailing
19 is credited with less of an influence, and --

20 A. I'd actually have to look.

21 Q. -- some of that influence is
22 credited instead to the dummy variables,
23 correct?

24 A. There's -- you're right. There
25 is a small decrease in the second coefficient

1 and the third coefficient is the same.

2 Q. Now, you've said many times
3 that it is a small decrease, but a couple of
4 follow-ups about that.

5 Is it standard practice in
6 econometrics to actually make qualitative
7 judgments about the differences between
8 coefficients based solely on their numeric
9 values?

10 MR. SOBOL: Objection.

11 A. I do not include a conclusion
12 about the quantitative difference between
13 these coefficients. I explain my reasons for
14 selecting Model B, and we've talked about
15 them. In terms of the results of Model C,
16 not based on the magnitude of that
17 difference.

18 Had there been a larger
19 magnitude of difference, I might have
20 considered the challenges with Model C
21 differently.

22 BY MR. METZ:

23 Q. I'm asking a simpler question,
24 which is: To an econometrician, do the --
25 what I'll call the real numbers -- so not

1 their weighted or contextualized or --
2 versions, but just the pure number, comparing
3 coefficients, coefficient A to coefficient B,
4 based solely on the number associated with
5 them, is that a comparison that
6 econometricians would typically make when
7 evaluating the significance of a change?

8 MR. SOBOL: Objection, asked
9 and answered, form.

10 A. I -- economists,
11 econometricians, almost always make
12 qualitative judgments about models because of
13 course there's part of it that is based on
14 theory as we've described.

15 So might an econometrician make
16 a quantitative analysis? Maybe. She might
17 also make qualitative judgments about which
18 model is preferred. Not everything can be
19 described quantitatively.

20 If I wanted to know exactly how
21 different these models are, I could make that
22 quantitative comparison. I was not
23 attempting to do that here.

24 BY MR. METZ:

25 Q. I'm just referring back to

1 where in response to my questions you kept
2 saying the difference was small.

3 And so as further explanation
4 on that, in comparing coefficients, don't you
5 also need to know the scale against which
6 they're being measured?

7 MR. SOBOL: Objection, asked
8 and answered.

9 BY MR. METZ:

10 Q. If you're comparing just the
11 real numbers, you need to know the scale to
12 which those correspond, correct?

13 MR. SOBOL: Objection, asked
14 and answered, mischaracterizes prior
15 testimony.

16 A. Yes, and the scale is evident
17 here, and again, if we go to the predicted
18 values, the scale is evident there as well.

19 BY MR. METZ:

20 Q. Did you not testify repeatedly
21 yesterday that the reason it doesn't matter
22 that you have an inflationary depreciation
23 rate is because all that that does is it gets
24 caught up in muting the impact of the
25 coefficients on the particular variables at

1 the particular times that they're measured?

2 MR. SOBOL: Objection, asked

3 and answered.

4 BY MR. METZ:

5 Q. Didn't you testify to that?

6 MR. SOBOL: Objection, form,

7 asked and answered.

8 A. I don't believe that I stated
9 that in the way that you have. All I said is
10 that the fact that promotional stock inflates
11 doesn't necessarily mean that the effect has
12 to inflate in the same way because the
13 measured promotional effectiveness, as we see
14 in both of these models, I find it decreasing
15 over time, and that counteracts.

16 I didn't say it doesn't -- it
17 doesn't have any effect. I'm just saying
18 that the effect of the misconduct is a
19 function both of the magnitude of the stock
20 and of the promotional effectiveness.

21 BY MR. METZ:

22 Q. And also in reference to your
23 answers to me that these changes don't matter
24 because the effect was small, it's also the
25 case that those changes, as you characterized

1 as small, are the result of five dummy
2 variables you included as a singular
3 robustness test, not a comprehensively
4 designed model attempting to comprehensively
5 control for these kinds of external events,
6 correct?

7 MR. SOBOL: Objection, form,
8 asked and answered, mischaracterizes
9 prior testimony.

10 A. As I described yesterday, and I
11 would restate now, given the performance of
12 these selected dummy variables, given the
13 adjusted R-squared of the model, the notion
14 that adding all of the events would improve
15 the performance of the model makes little
16 sense to me. And that is why I did not run a
17 model with every dummy variable in it.

18 BY MR. METZ:

19 Q. Well, after running a model
20 with dummy variables, two of which
21 individually were statistically significant,
22 and the five of which were collectively
23 statistically significant, you did not
24 attempt to construct a further model with
25 more dummy variables to see whether or not

1 that had a greater impact on your measure of
2 the relationship between detailing and MMEs,
3 did you?

4 MR. SOBOL: Objection.

5 A. Having run Model C and
6 comparing the results to Model B, I deemed
7 that it would not be fruitful to add further
8 dummy variables and run a more expansive
9 version of Model C.

10 BY MR. METZ:

11 Q. Do you agree that as a general
12 matter in regression analysis failure to
13 include a major explanatory variable that is
14 correlated with the variable of interest in
15 the regression model may cause an included
16 variable to be credited within an effect that
17 actually is caused by the excluded variable?

18 A. As we discussed earlier today,
19 that notion which you just describe of
20 omitted variable bias is a factor in any
21 analysis, and there are constraints on how
22 many variables one can include in an
23 analysis.

24 So while it's always going to
25 be true that there is a possibility of

1 omitted variable bias, it's my opinion that
2 including more of these event variables in
3 the model would not improve the performance
4 of the model.

5 Q. You mentioned the word
6 "constraint" in that answer. And in previous
7 testimony you've mentioned a term called
8 "degrees of freedom."

9 A. Yes.

10 Q. Can you explain what degrees of
11 freedom are as related to a constraint on the
12 number of variables that can be included in a
13 model?

14 A. It has to do with the number of
15 observations and the number of included
16 variables. It also has to do with the
17 correlation in these data, so as we add more
18 and more dummy variables, the chances that we
19 get colinearity are higher.

20 Q. And degree of freedom refers in
21 part to a point beyond which there's
22 insufficient data to account for the number
23 of permutations that more and more variables
24 will introduce into the model; is that fair?

25 A. In effect, it makes it

1 impossible to estimate the model.

2 Q. Okay. Did you have adequate
3 data to add additional dummy variables beyond
4 the five you included without running into
5 the limit imposed by however many degrees of
6 freedom you had?

7 MR. SOBOL: Objection, assumes
8 a fact not in evidence.

9 A. I have adequate data in terms
10 of degrees of freedom. In terms of concerns
11 about adding more dummy variables and having
12 them be correlated with one another to the
13 point where I'm getting results like the ones
14 I can see in Model C, where the coefficients
15 are clearly picking up something different,
16 that is the concern.

17 BY MR. METZ:

18 Q. So if I understand, your
19 concern is that had you inquired further, you
20 might have found nonsensical results?

21 MR. SOBOL: Objection,
22 mischaracterizes the testimony.

23 A. My concern is that adding dummy
24 variables would likely just make the other
25 dummy variables nonsensical, whereas Model B

1 compared to Model C, again, has qualitatively
2 similar promotional effects that adding
3 further dummy variables would simply
4 interfere with the meaning of the dummy
5 variables that are already in them. They
6 would be impossible to differentiate.

7 BY MR. METZ:

8 Q. What's the basis for your
9 statement that would likely be the
10 consequence of adding additional dummy
11 variables?

12 A. Just we talked before that
13 these dummy variables are zero until they
14 turn on and one after, and if we add one
15 every six months, then we have a whole lot of
16 vectors that are zero. You know, sort of in
17 a staggered way, they're going to be highly
18 correlated.

19 Q. And nonetheless, you did not
20 test whether that would be the outcome of
21 adding additional dummy variables or other
22 explanatory variables, correct?

23 A. I did not consider adding other
24 dummy variables.

25 Q. Okay. And there are

1 conceivably other variables that are not
2 dummy variables that one could add to test
3 for the presence of additional factors,
4 correct?

5 MR. SOBOL: Objection.

6 A. I include the standard factors
7 that are included in an aggregate time series
8 analysis of pharmaceutical promotion, which
9 are -- I'm sorry, of pharmaceutical sales,
10 which are promotion and price.

11 BY MR. METZ:

12 Q. Okay. But there are -- in any
13 regression, one of the tasks is to
14 hypothesize as to other conduct that could
15 affect the variable of interest, and where
16 available, to include data that would capture
17 that conduct, correct?

18 MR. SOBOL: Objection, asked
19 and answered.

20 A. Starting with the theory of
21 demand for pharmaceuticals, I've constructed
22 this model, including the most important
23 variables, and again, one does not -- a
24 well-constructed model focuses on the most
25 important variables.

1 This model using price and
2 promotion is the same as models that I have
3 used in similar instances, and it's very
4 similar to the models in Berndt, except that
5 those are at product level, but they also
6 focus on price and promotion.

7 So in a time series context,
8 there aren't a lot of other variables that
9 you could even imagine would be included, and
10 in my opinion, price and promotion are the
11 key variables here.

12 BY MR. METZ:

13 Q. Did you spend any significant
14 time in contemplative thought trying to
15 imagine additional variables to include in
16 your model beyond the ones you included?

17 MR. SOBOL: Objection, asked
18 and answered.

19 A. I've spent 300 hours in
20 developing the analyses that are in my
21 report. I spent considerable time thinking
22 about this model, and it wasn't the first
23 time that I had thought about such analyses,
24 as you know.

25 ///

1 BY MR. METZ:

2 Q. Now, did you -- within those
3 300 hours, did you spend any significant time
4 seeking to identify the key events that
5 should be attempted to be replicated with the
6 dummy variables you ended up using?

7 MR. SOBOL: Objection, asked
8 and answered.

9 A. Yes, you can see in my report
10 that I culled those events again from various
11 sources.

12 BY MR. METZ:

13 Q. Yes, and when I asked you about
14 it, the answer you gave to me was that you
15 looked at the expert report of Dr. Perri.

16 A. Yes.

17 Q. You looked at the plaintiffs'
18 complaint.

19 A. Yes.

20 Q. And you looked at one timeline
21 on the website, I believe of the FDA?

22 A. The FDA timeline. Those are
23 the primary sources, yes.

24 Q. Okay. Now, did you see
25 Dr. Perri's report significantly before your

1 own report was finalized?

2 A. I don't know what you mean by
3 significantly.

4 Q. Well, in time to adequately
5 evaluate whether the events described there
6 were the key events you should be attempting
7 to model for?

8 A. Yes, I did.

9 Q. How many days in advance?

10 MR. SOBOL: Objection.

11 A. I can't say. I can't say for
12 sure when I saw that, but I obtained the
13 information from Dr. Perri's report as I was
14 putting together my model.

15 BY MR. METZ:

16 Q. Okay. Was it time adequate
17 that when you ran your Model C and two of the
18 dummy variables came back individually
19 significant and the five collectively came
20 back significant, did you then have time to
21 consider and design and implement and still
22 disclose on time another model with better
23 dummy variables?

24 A. The --

25 MR. SOBOL: Objection to

1 "better."

2 A. Time was not the issue here. I
3 decided not to run a model with more dummy
4 variables.

5 BY MR. METZ:

6 Q. Okay. I'm going to hand you
7 what we're marking as Exhibit 29.

8 (Whereupon, Deposition Exhibit
9 Rosenthal-29, Joint Statement,
10 Promoting Pain Relief and Preventing
11 Abuse of Pain Medications: A Critical
12 Balancing Act, was marked for
13 identification.)

14 BY MR. METZ:

15 Q. Have you seen Exhibit 29
16 previously?

17 A. I believe so, yes.

18 Q. What is it?

19 A. I'm actually looking for the
20 date on it. Does it have a date?

21 Q. Well, I can represent to you
22 that the particular version you're holding
23 was pulled from an Internet archive that
24 dates it as of a date that it was on the
25 Internet, which may not be the first date it

1 was on the Internet.

2 A. I see.

3 Q. And in the top right corner it
4 dates it as November 27, 2001.

5 A. I think is the -- it's the
6 joint statement on promoting pain relief and
7 preventing abuse of pain medications, but,
8 sorry, what date did you think it was
9 actually from?

10 Q. Well, the date that this
11 particular copy is from --

12 A. Right.

13 Q. -- is November of 2001.

14 A. So it came out sometime before
15 that.

16 Q. The date it was pulled on the
17 Internet. I can't represent to you what date
18 exactly it was, although I believe it to be a
19 somewhat consistent time to what's reflected
20 here, but I can't represent that to you.

21 A. Yes, I'm not sure if I have
22 seen this specific document.

23 Q. Okay. And do you believe in
24 looking at your Figure 5 that this is one of
25 the event -- the key events dated on your

1 timeline?

2 A. I'd have to look.

3 MR. SOBOL: Objection.

4 A. I just need to go back and
5 find --

6 BY MR. METZ:

7 Q. I think Figure 5 is on page 41.

8 A. Thank you. I must have blown
9 past it.

10 I don't believe that this is
11 part of it. I was thinking of the consensus
12 statement. But I think this joint statement
13 is something different, but --

14 Q. Okay.

15 A. It's certainly labeled
16 something different.

17 Q. So to your knowledge, you have
18 not seen this previously; is that correct?

19 A. To my knowledge, no.

20 Q. All right. It's titled A Joint
21 Statement from 21 Health Organizations and
22 the Drug Enforcement Administration.

23 Do you see that?

24 A. I do.

25 Q. And the title beneath that is

1 Promoting Pain Relief and Preventing Abuse of
2 Pain Medications: A Critical Balancing Act.

3 Do you see that?

4 A. I do.

5 Q. Okay. And since you've not
6 seen this before, I just want to read some of
7 the included terms. It begins: As
8 representatives of the healthcare community
9 and law enforcement, we're working together
10 to prevent abuse of prescription pain
11 medications while ensuring that they remain
12 available for patients in need.

13 Do you see that?

14 A. Yes.

15 Q. And then skipping over a
16 paragraph, the next one down, it says:
17 Preventing drug abuse is an important
18 societal goal, but there is consensus by law
19 enforcement agencies, healthcare
20 practitioners and patient advocates alike
21 that it should not hinder patients' ability
22 to receive the care they need and deserve.

23 Do you see that?

24 A. I do.

25 Q. And then it says: This

1 consensus statement is necessary based on the
2 following facts.

3 First bullet: Undertreatment
4 of pain is a serious problem in the United
5 States, including pain among patients with
6 chronic conditions and those who are
7 critically ill or near death. Effective pain
8 management is an integral and important
9 aspect of quality medical care and pain
10 should be treated aggressively.

11 Do you see that?

12 A. I do.

13 Q. And then the next bullet says:
14 For many patients, opioid analgesics, when
15 used as recommended by established pain
16 management guidelines, are the most effective
17 way to treat their pain and often the only
18 treatment option that provides significant
19 relief.

20 Do you see that?

21 A. I do.

22 Q. And would you agree with me
23 that shares some of the characteristics of
24 the statement you testified about earlier as
25 well as yesterday, the joint statement?

1 MR. SOBOL: Objection, beyond
2 the scope.

3 A. Are you referring to --

4 MR. METZ: Beyond the scope of
5 what?

6 MR. SOBOL: Beyond the scope of
7 her opinions. You've got a document.

8 MR. METZ: That's the point.

9 MR. SOBOL: You've got a
10 document before her that she says she
11 hasn't seen before.

12 MR. METZ: Okay. Thank you.

13 MR. SOBOL: And you're asking
14 her then to, so far, just read it with
15 you, and now you've asked her to
16 compare a document that she hasn't
17 seen to a document that is referenced
18 in her report, right? So that's
19 beyond the scope of her opinion.

20 BY MR. METZ:

21 Q. Would you agree with me that
22 this document and the portions I just read in
23 particular share some of the characteristics
24 that you identified about the joint statement
25 that you testified about earlier today in

1 answer to my questions as well as yesterday?

2 MR. SOBOL: Objection, form and
3 beyond the scope.

4 A. Yesterday and today we talked
5 about the American Academy of Pain Management
6 and American Pain Society consensus
7 statement, and how it describes pain as being
8 undertreated and the utility of opioid
9 treatment.

10 So in that sense, I can read
11 here that this statement also describes pain
12 as undertreated and opioid analgesics as an
13 effective treatment.

14 BY MR. METZ:

15 Q. And we discussed as well the --
16 at least the potential that the reputations
17 of the bodies making those statements would
18 be part of what made that -- a statement like
19 that significant.

20 Do you recall discussing that
21 with me?

22 MR. SOBOL: Objection. Is the
23 question -- no --

24 MR. METZ: The question is if
25 she recalls the testimony.

1 MR. SOBOL: Okay. So
2 objection, mischaracterizes her prior
3 testimony, and form.

4 A. I recall the discussion where I
5 said that I believed one of the reasons that
6 pharmaceutical manufacturers might seek to
7 influence such statements is because the
8 reputation of professional societies may
9 legitimize their activity.

10 BY MR. METZ:

11 Q. Okay. And you would agree with
12 that the -- as a general matter, the Drug
13 Enforcement Administration is a reputable
14 organization on matters pertaining to the
15 legitimate use of controlled substances?

16 MR. SOBOL: Objection, scope of
17 her opinion.

18 A. I understand that the Drug
19 Enforcement Administration is the federal
20 agency responsible for enforcing laws that
21 pertain to controlled substances. I don't
22 know -- I guess I don't know "reputable."
23 I'm not an expert on the DEA. I don't really
24 know its reputation. I certainly know what
25 its function is.

1 BY MR. METZ:

2 Q. You think the DEA might be
3 disreputable on the subject of legitimate
4 uses of controlled substances?

5 MR. SOBOL: Objection, scope,
6 form.

7 A. I'm just saying I don't know
8 the DEA's reputation. I know its purpose is
9 to regulate controlled substances.

10 BY MR. METZ:

11 Q. As an economist forming
12 hypotheses --

13 MR. SOBOL: Wait a second. Are
14 you done with this exhibit?

15 MR. METZ: I haven't marked a
16 new one. Is there a reason for
17 interrupting me?

18 MR. SOBOL: Yes. I want to
19 know if you were done with this
20 exhibit.

21 MR. METZ: For what purpose?
22 If you want -- I've set mine aside.
23 If you'd like to set yours aside, set
24 it aside, but I don't see the purpose
25 for interrupting me.

1 MR. SOBOL: Okay. You've asked
2 to set it aside. I move to strike all
3 the questions regarding the exhibit
4 because they do not relate to the
5 report and she has not seen the
6 exhibit before.

7 MR. METZ: Well --

8 MR. SOBOL: Go ahead.

9 MR. METZ: -- that's the point
10 in cross-examining an expert on the
11 sufficiency of her inquiry is to test
12 her on things that she might not have
13 inquired about or seen, perhaps
14 because Dr. Perri didn't flag them for
15 her.

16 BY MR. METZ:

17 Q. The question I was going to ask
18 you is: An economist, hypothesizing the key
19 events that might be causally related to the
20 sale of MMEs, and bearing in mind that you
21 previously said a statement like this from a
22 private organization would be sufficient to
23 at least form a hypothesis, would you not
24 hypothesize that the DEA among 28 other
25 health organizations recognizing the

1 undertreatment of pain and the potential for
2 opioids to treat, not just pain generally but
3 also chronic pain, could potentially have had
4 an impact on MME sales?

5 MR. SOBOL: Objection.

6 BY MR. METZ:

7 Q. Is that a reasonable hypothesis
8 for an economist in your position undertaking
9 a study like this?

10 MR. SOBOL: Objection, form,
11 compound.

12 A. A statement like this, like the
13 statements I do cite in my report, may have
14 had an effect on sales, and because there
15 were many such statements happening, I use
16 the differential promotional effectiveness
17 over time to capture these broader effects
18 across a larger number of factors.

19 I believe something like this,
20 if it were widely disseminated -- I don't
21 really know how widely disseminated this
22 was -- may have had an effect, and therefore,
23 that would be captured in my promotional
24 effectiveness.

25 ///

1 BY MR. METZ:

2 Q. Well, that's the hypothesis
3 described in paragraph 73 that Model C was
4 intended to test, correct?

5 MR. SOBOL: Objection,
6 misrepresent -- mischaracterizes the
7 testimony.

8 A. My hypothesis is that these
9 events early and late affected promotional
10 effectiveness. Model C is a particular way
11 of testing them, which has the limitations of
12 involving a large number of dummy variables.

13 I conclude that those dummy
14 variables do not qualitatively affect my
15 results, and we can go back to that
16 discussion if you want, but that was my
17 conclusion.

18 BY MR. METZ:

19 Q. Yeah.

20 A. And that, in fact, the
21 differential promotional effectiveness over
22 time is picking up the influence of these
23 environmental factors.

24 Q. Okay. Only because I'm short
25 on time I'll ask it this way.

1 You described in paragraph 73
2 of your report a hypothesis about the need to
3 explicitly include control for these kinds of
4 events as being the purpose of the robustness
5 test in paragraph 73.

6 That's what you -- or the
7 robustness test in Model C, excuse me.
8 That's what you say in paragraph 73, correct?

9 MR. SOBOL: Objection.

10 Objection to the form.

11 A. In paragraph 73, I say, in the
12 middle of the first sentence: I tested the
13 robustness of Model B by examining whether
14 indicators of specific events and policies
15 should be explicitly included in my model.

16 BY MR. METZ:

17 Q. Thank you.

18 And in Model C, where you
19 included dummy variables, you included three
20 dummy variables that turned on --

21 A. Yes.

22 Q. -- prior to -- prior to
23 November of 2001, correct?

24 A. That's correct.

25 Q. And the most proximate in time

1 of those turned on -- was it in January of
2 2001 or does it turn on in February? I
3 wasn't clear from the way you described in
4 your model.

5 A. I need to look in the errata,
6 because I think what was stated in the report
7 was different in two different places.

8 Q. Okay.

9 A. So let me just take a quick
10 look.

11 Q. For purposes of my question
12 this will be sufficient.

13 A. Okay.

14 Q. It's either/or January or
15 February, correct? If the dummy variable is
16 dated January 2001.

17 A. I believe that that is true. I
18 just didn't want to misstate it. You're
19 talking about the JCAHO pain standards.

20 Q. Yes.

21 A. Yes.

22 Q. Okay. And then if this
23 statement, in fact, was released in November
24 of 2001, that is ten months after your dummy
25 variable had already turned on, correct?

1 A. That's correct.

2 Q. And then you do not have
3 another dummy variable that you include until
4 August of 2010, which is close to nine years
5 later.

6 A. Yes. And because the dummy
7 variable stays on, it will pick up any level
8 shift over time after that, controlling for
9 other factors, right.

10 Q. Any level shift that in the
11 calculation shows up is correlated with the
12 dummy variable from nine months earlier,
13 correct?

14 A. Yes, but again, the dummy
15 variable stays on over the period when this
16 would have been released.

17 Q. Does not the distance from the
18 dummy variable have a bearing upon the
19 significance that that variable will attach
20 to events later in time?

21 A. Well, again, it is literally
22 picking up an average shift before compared
23 to after.

24 Q. Okay. And if there are other
25 unexplained events going on, you might

1 attribute those to dummy variables that are
2 years apart from when you first turned them
3 on, correct?

4 MR. SOBOL: Objection.

5 A. This is why I conclude that
6 Model B is the more appropriate approach
7 here, to not try to disentangle those things.

8 BY MR. METZ:

9 Q. Okay. But in the ideal design
10 of your model, as you told me before, you
11 picked the timing of the dummy variable to
12 coincide with the key events, not to have
13 them be months prior so that they'll just
14 sweep them up eventually, correct?

15 MR. SOBOL: Objection, form.

16 A. The dummy variables are
17 intended to reflect the timing of these key
18 events? Yes.

19 BY MR. METZ:

20 Q. The -- any dummy variable, the
21 timing for when you turn it on, is intended
22 to be timing that makes sense in light of the
23 key events you're testing for, right?

24 A. It does. I'm just saying that
25 just mathematically, the case that while that

1 timing is important, it's important because
2 it differentiates pre from post. It
3 doesn't -- it's not instantaneous.

4 Q. Okay. And nonetheless, you put
5 your variable in January 2001 in order to
6 attempt to simulate for an event occurring in
7 or around January 2001, correct?

8 MR. SOBOL: Objection, asked
9 and answered.

10 A. Yes.

11 (Whereupon, Deposition Exhibit
12 Rosenthal-30, State of Ohio House Bill
13 No. 187, was marked for
14 identification.)

15 BY MR. METZ:

16 Q. I'm going to hand you an
17 exhibit we've marked Exhibit 30. I'd like
18 you to take a look at that and tell me if
19 you've seen it before.

20 A. I just want to check my
21 documents relied upon. My memory is not
22 always reliable.

23 (Document review.)

24 A. I don't think that I've seen
25 this document before.

1 BY MR. METZ:

2 Q. Well, in that case, Exhibit 30
3 is a printout from a legal -- well, from a
4 book of Ohio session laws, and it's entitled
5 H.B. No. 187, and in the title it says
6 Treatment of Intractable Pain.

7 Do you see that?

8 A. I do see that.

9 Q. Okay. It's described as an act
10 regarding the authority of physicians to
11 prescribe, dispense and administer dangerous
12 drugs for management of intractable pain.

13 Do you see that?

14 A. I see that.

15 Q. And under the first -- when you
16 look into the body of the bill, next to
17 number 2 it defines intractable pain.

18 Do you see that?

19 A. Yes.

20 Q. And it means a state of pain
21 that is determined, after reasonable medical
22 efforts have been made to relieve the pain or
23 cure its cause, to have a cause for which no
24 treatment or cure is possible or for which
25 none has been found.

1 Do you see that?

2 A. Yes.

3 Q. And then if you skip down
4 to (C), the bill states that when a physician
5 diagnoses an individual as having intractable
6 pain, the physician may treat the pain by
7 managing it with dangerous drugs in amounts
8 or combinations that may not be appropriate
9 when treating other medical conditions.

10 Do you see that?

11 A. I do.

12 Q. Do you understand intractable
13 pain as so described here to have a similar
14 meaning to chronic pain?

15 MR. SOBOL: Objection, scope.

16 A. I do not, no.

17 BY MR. METZ:

18 Q. Okay. Do you understand it to
19 be describing pain for which -- pain that
20 will endure over a longer period because
21 there is no -- no other means of curing it?

22 MR. SOBOL: Objection, scope.

23 A. Well, I'm not a clinical
24 expert. It seems to define it as having no
25 treatment or cure. It does not say anything

1 about the longevity of the pain.

2 BY MR. METZ:

3 Q. Okay. And then if you flip
4 ahead to subpart (D), which is on the second
5 page, it states that a physician who treats
6 intractable pain by managing it with
7 dangerous drugs is not subject to
8 disciplinary action by the board under
9 Section 4731.22 of the revised code, solely
10 because the physician treated the intractable
11 pain with dangerous drugs.

12 The physician is subject to
13 disciplinary action only if the dangerous
14 drugs are not prescribed, administered or
15 dispensed in accordance with this section and
16 the rules adopted under it.

17 Do you see that?

18 A. I do.

19 Q. And were you aware prior to
20 this moment of a law that was passed in Ohio
21 in the late 1990s that provided doctors with
22 legal protection for -- against circumstances
23 in which they treated patients with pain
24 using dangerous drugs? Were you aware of
25 such a law being passed?

1 MR. SOBOL: Objection, form.

2 A. I couldn't have told you when
3 such a law was passed in Ohio.

4 I was aware from the complaint
5 and from Dr. Perri's report that the
6 influence -- the industry allegedly
7 influenced such guidelines, including, as I
8 include in my timeline, the model guidelines
9 supplied by the Federation of State Medical
10 Boards, and I take this to be an example of
11 one that was implemented in Ohio.

12 BY MR. METZ:

13 Q. So is it your understanding
14 that a state medical board guideline and a
15 Ohio statute passed by the legislature of
16 Ohio to be functionally equivalent? Is that
17 what your answer was?

18 MR. SOBOL: Objection,
19 mischaracterizes her testimony.

20 MR. METZ: That's why I'm
21 asking for clarification.

22 A. I'm not a lawyer or a state
23 regulatory expert. These guidelines that I'm
24 seeing for the first time reading them, they
25 are consistent with what I understand the

1 goal of the Federation for State Medical
2 Board Model Guidelines were, this protection
3 from liability.

4 BY MR. METZ:

5 Q. They're consistent in their
6 goals; they're inconsistent that -- in the
7 sense that in this instance, pertaining to
8 Ohio, it's being adopted by the 122nd Elected
9 General Assembly of the State of Ohio.

10 Do you see that?

11 MR. SOBOL: Objection. Oh,
12 just do you see that? That's fine.

13 A. I do.

14 BY MR. METZ:

15 Q. Okay. And do you agree with me
16 that there is a difference between a private
17 or a standard-setting unelected body creating
18 some rule or regulation and the elected
19 assembly of a state like Ohio enacting a law?

20 MR. SOBOL: Objection to the
21 scope.

22 BY MR. METZ:

23 Q. Do you see a difference between
24 those two things?

25 MR. SOBOL: Objection to scope.

1 A. I'm not a legal or regulatory
2 expert, so I don't have an opinion about the
3 different effects of those two things.

4 BY MR. METZ:

5 Q. Okay. To be clear, I wasn't
6 asking about effects. I was asking about the
7 nature of the body adopting them.

8 Do you see a difference in the
9 nature of the body adopting what you've
10 described as guidelines versus the Assembly
11 of Ohio adopting a law?

12 MR. SOBOL: Objection, asked
13 and answered.

14 A. I understand that -- again, I
15 understand that this is a law, and I believe
16 the model guidelines were intended to
17 influence regulations. I understand the
18 difference between those two things.

19 BY MR. METZ:

20 Q. Okay. Thank you.

21 Now, this also does not appear
22 on your timeline of key events, correct?

23 A. It does not.

24 Q. Okay. And you did not design a
25 dummy variable with the specific intention of

1 trying to capture any effects from this law,
2 correct?

3 A. I did not.

4 Q. Okay. And, in fact, although
5 your testimony is being used solely for
6 purposes of this case, within two counties in
7 Ohio, your aggregate analysis is done on a
8 national level, correct?

9 MR. SOBOL: Objection, asked
10 and answered.

11 A. My analysis is a national
12 aggregate analysis.

13 BY MR. METZ:

14 Q. And one consequence of doing a
15 national aggregate analysis is that if a law
16 like this had an impact within the state of
17 Ohio, that effect might be muted in your
18 national analysis because there's 49 other
19 states, right?

20 MR. SOBOL: Objection, form.

21 A. The national analysis will be
22 affected by the extent of such laws across
23 the country, not on just one state.

24 BY MR. METZ:

25 Q. And if Ohio was

1 disproportionately affected by a law such as
2 this, that effect might be different from the
3 average that's reflected in your national
4 aggregate analysis, correct?

5 MR. SOBOL: Objection, form.

6 A. That may be the case. As I
7 understand this law, it seems to be that it
8 would cause even more prescribing than I
9 estimate on average, if other states lag
10 Ohio.

11 BY MR. METZ:

12 Q. Okay. Even more within Ohio is
13 what you're saying?

14 A. Even more than I attribute to
15 Ohio, yes.

16 Q. Okay. Now, that law was not
17 identified for you by Dr. Perri as one of the
18 key events as it related to your opinions for
19 Cuyahoga and Summit Counties, correct?

20 A. Just to be clear, Dr. Perri
21 wasn't identifying for me. I understand the
22 events that he described in his reports, that
23 he identifies as part of his report as being
24 important.

25 Q. And in part because this was

1 not described in that report and because it
2 is not reflected in plaintiffs' complaint,
3 it's not one of the key events that you put
4 into your Figure 5, correct?

5 MR. SOBOL: Objection,
6 mischaracterizes the testimony.

7 A. I do not believe it appears in
8 the sources that I used to put together
9 Figure 5.

10 BY MR. METZ:

11 Q. Okay.

12 A. So I did not rely on it.

13 Q. In the inquiry you
14 independently undertook to identify what key
15 events should be accounted for in your model,
16 did you come across any information
17 indicating that, in fact, this law had had an
18 influence on MMEs within the state of Ohio
19 such that it should be accounted for?

20 A. I am not aware of anything, no.
21 I did not come across that.

22 (Whereupon, Deposition Exhibit
23 Rosenthal-31, Ohio Prescription Drug
24 Abuse Task Force Final Report, was
25 marked for identification.)

1 BY MR. METZ:

2 Q. I'm going to hand you an
3 exhibit marked Exhibit 31.

4 MR. SOBOL: Where are we on the
5 time?

6 MR. METZ: I think I have about
7 15 minutes.

8 THE VIDEOGRAPHER: 19.

9 MR. SOBOL: Thanks.

10 THE WITNESS: Go ahead.

11 BY MR. METZ:

12 Q. Have you seen this document
13 before?

14 A. I don't think so. I should
15 check again my documents cited.

16 (Document review.)

17 A. I assume it would be under O
18 for Ohio.

19 BY MR. METZ:

20 Q. I haven't checked. It could
21 also be under 2010. I don't know.

22 A. I don't think so.

23 Q. Okay. You don't recognize it
24 as you sit here?

25 A. I don't.

1 Q. Okay. I will represent to you
2 that Exhibit 31 is a final report and task
3 force recommendations from a body known as
4 the Ohio Prescription Drug Abuse Task Force.

5 Do you see that?

6 A. Yes.

7 Q. And in your inquiry and
8 research into finding the key factors that
9 you try to be accounted for in your model,
10 did you at any point come to learn that Ohio
11 had commissioned a drug abuse task force
12 relating to the subject of prescription
13 drugs?

14 A. I believe that I was aware that
15 there had been activity in Ohio related to
16 combatting the opioid epidemic.

17 Q. Okay. But you don't recall
18 seeing any report or other information about
19 that, do you?

20 A. I don't recall.

21 Q. Okay. Now, I want you to turn
22 first to page 21, just so I can orient you to
23 the section in which a later page appears.

24 A. Okay.

25 Q. Do you see that there's a

1 heading there that says How Did This Become
2 an Epidemic?

3 A. Yes, I do.

4 Q. And there's some information
5 there followed by a chart, okay?

6 A. Yes.

7 Q. If you turn to the next page,
8 the next -- the section at the top of page 22
9 talks about the law that we just considered,
10 that we just looked at, and I'll just read it
11 into the record.

12 Under the heading Changes in
13 Clinical Pain Management, the document
14 states: Growing recognition by professionals
15 of the undertreatment of pain in the late
16 1990s prompted needed changes in clinical
17 pain management guidelines at the national
18 level, as well as changes in Ohio's law
19 regarding the treatment of intractable pain.
20 As defined in Ohio law, intractable pain
21 means a state of pain that is determined,
22 after reasonable medical efforts have been
23 made to relieve the pain or cure its cause,
24 to have a cause for which no treatment or
25 cure is possible or for which none has been

1 found.

2 Do you see that?

3 A. Yes.

4 Q. And you recall that's the
5 definition we read from the statute a moment
6 ago, correct?

7 A. It looks like it's verbatim.

8 Q. Okay. So the next paragraph
9 says: To address the perception that
10 prescribing adequate amounts of controlled
11 substances would result in unnecessary
12 scrutiny by regulatory authorities, Ohio's
13 Intractable Pain Act provided that physicians
14 treating intractable pain are not subject to
15 disciplinary action when practicing in
16 accordance with accepted and prevailing
17 standards of care and rules adopted by the
18 medical board delineating those standards.

19 Do you see that?

20 A. Yes. And I guess now I see how
21 the law connects to the state medical board
22 standards. They're clearly interlocking.

23 Q. And then it says: Such
24 fundamental changes in the recognition and
25 treatment of pain contributed to increased

1 prescribing and concomitant availability of
2 and exposure to potent opioid analgesics,
3 pain medications.

4 Do you see that?

5 A. I do.

6 Q. Okay. So prior to now, were
7 you aware that an appointed task force
8 appointed by the government of the State of
9 Ohio had, in a report, concluded that the law
10 we looked at a moment ago from 1997 had
11 contributed to the levels of prescription
12 opioids dispensed in Ohio during the period
13 covered by your study?

14 MR. SOBOL: Objection, form,
15 asked and answered.

16 A. I wasn't aware of this specific
17 report. Again, going back to the context of
18 Dr. Perri's report and what I understand the
19 allegations are in this matter, it does not
20 come as a surprise to me that this was found.
21 And again, this explicitly references those
22 state medical board guidelines.

23 Those, as I understand it,
24 plaintiffs intend to prove were a vehicle for
25 increasing -- basically opening the flood

1 gates for opioid prescribing. So this simply
2 confirms that the State of Ohio has found
3 that to be true.

4 BY MR. METZ:

5 Q. And you did not include in your
6 model a variable intended to capture, for
7 sales within Ohio, the influences of the
8 statute, correct?

9 MR. SOBOL: Objection, asked
10 and answered.

11 MR. METZ: It's really a
12 yes-or-no question.

13 MR. SOBOL: Well, you can
14 answer it however you think you need
15 to.

16 A. I included in my model national
17 variables. And as I've noted, I believe
18 factors such as these are why promotion was
19 so effective in that early part of the period
20 that I analyze.

21 In my view, it would not be
22 appropriate to try to pull out this effect
23 when it is all part of how promotion caused
24 sales.

25 ///

1 BY MR. METZ:

2 Q. Well, in your view in -- as
3 expressed in paragraph 73, it was necessary
4 as a robustness test to test the very
5 assumption you just stated to me as to
6 whether these events, events like this, had a
7 sufficiently strong influence to render
8 Model B inaccurate.

9 MR. SOBOL: Objection.

10 BY MR. METZ:

11 Q. Isn't that what you said in
12 your report?

13 MR. SOBOL: Objection, asked
14 and answered already.

15 A. As I said in my report, I'm
16 testing the form of the model. I do not -- I
17 do not use Model C in calculating damages,
18 but it is not my belief that those variables
19 necessarily would occur in a but-for
20 scenario.

21 And so Model C, the robustness
22 check is around the specification, and while
23 I understand that you respectfully disagree,
24 I conclude that, in fact, Model C supports
25 the use of Model B. But even if there were a

1 significant dummy variable in Model C, it
2 wouldn't necessarily be the case that that
3 variable would exist in the but-for world.

4 BY MR. METZ:

5 Q. Okay. So to -- if I could
6 strip that down to a more relatable
7 statement.

8 You're postulating a but-for
9 world in which the State of Ohio's General
10 Assembly does not enact the statute that we
11 just looked at?

12 MR. SOBOL: Objection,
13 mischaracterizes her testimony.

14 A. I don't know about the specific
15 law, but many of those events, including the
16 state medical board guidelines, which appear
17 to interact with the law, are posited by
18 plaintiffs to have been caused by the conduct
19 of defendants.

20 MR. METZ: Why don't we go off
21 the record.

22 THE VIDEOGRAPHER: The time is
23 3:26 p.m. We're now off the record.

24 (Recess taken, 3:26 p.m. to
25 3:33 p.m.)

1 THE VIDEOGRAPHER: The time is
2 3:33 p.m. We're back on the record.

3 EXAMINATION

4 BY MR. GEISE:

5 Q. Professor Rosenthal, my name is
6 Steve Geise. I represent Walmart in this
7 case. We had a chance to meet off the record
8 and I just have a very few questions for you
9 today because our time is running to a close.

10 In response to questions from
11 Mr. Metz, you indicated you had not analyzed
12 pharmacy conduct at all for purposes of your
13 opinions; is that correct?

14 MR. SOBOL: Objection, asked
15 and answered.

16 A. Yes, I do not analyze pharmacy
17 conduct in my analysis.

18 BY MR. GEISE:

19 Q. Yesterday in response to a
20 question, you testified that distributors'
21 conduct was outside the scope of your report.
22 Is it true that retail pharmacy conduct is
23 also outside the scope of your report?

24 MR. SOBOL: Objection.

25 A. My analysis does not include

1 retail pharmacy conduct.

2 BY MR. GEISE:

3 Q. The assignment that you were
4 given by plaintiffs' counsel did not include
5 considering any conduct by a retail pharmacy
6 defendant, correct?

7 A. My assignment pertains to the
8 marketing conduct and not to the conduct of
9 retail pharmacies.

10 Q. If you look at Exhibit 1 to
11 your deposition, which is your expert report,
12 in particular, your Figure 1 on page 19, this
13 is your promotion ecosystem, correct?

14 A. Yes.

15 Q. You would agree that retail
16 pharmacy defendants are not part of that
17 promotion ecosystem at all, correct?

18 A. Retail pharmacies are not part
19 of the promotion ecosystem that I describe
20 here.

21 MR. GEISE: Thank you. Those
22 are my questions.

23 THE VIDEOGRAPHER: The time is

24 3:34 p.m. We're off the record.

25 (Recess taken, 3:34 p.m. to

1 3:35 p.m.)

2 THE VIDEOGRAPHER: The time is

3 3:35 p.m. We're back on the record.

4 EXAMINATION

5 BY MR. SOBOL:

6 Q. You were asked some questions
7 yesterday and today about the assignment that
8 you were given. The assignment you were
9 given was with respect to modeling the
10 combined effect of certain manufacturer
11 defendants' marketing, correct?

12 A. Yes, that's correct.

13 Q. The lawyers, though, didn't
14 tell you what type of model you should use,
15 correct?

16 A. That's correct.

17 Q. You chose the aggregate model,
18 correct?

19 A. I chose the aggregate model to
20 estimate aggregate impact, as I have
21 described over the last day and a half,
22 because the aggregate model allows me to
23 capture spillover effects and is the most
24 efficient way to estimate the combined effect
25 of defendants' alleged marketing misconduct.

1 MR. SOBOL: Nothing further.

2 MR. ROTH: No follow-up here.

3 THE VIDEOGRAPHER: That
4 concludes the deposition of Meredith
5 Rosenthal. The time is 3:36 p.m., and
6 we're now off the record.

7 (Proceedings recessed at
8 3:36 p.m.)

9 --o0o--

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CERTIFICATE

I, MICHAEL E. MILLER, Fellow of the Academy of Professional Reporters, Registered Diplomate Reporter, Certified Realtime Reporter, Certified Court Reporter and Notary Public, do hereby certify that prior to the commencement of the examination, MEREDITH B. ROSENTHAL, Ph.D. was duly sworn by me to testify to the truth, the whole truth and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by and before me at the time, place and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that pursuant to FRCP Rule 30, signature of the witness was not requested by the witness or other party before the conclusion of the deposition.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.



MICHAEL E. MILLER, FAPR, RDR, CRR
Fellow of the Academy of Professional Reporters
NCRA Registered Diplomate Reporter
NCRA Certified Realtime Reporter
Certified Court Reporter

Notary Public

My Commission Expires: 7/9/2020

Dated: May 6, 2019

1 INSTRUCTIONS TO WITNESS

2
3 Please read your deposition over
4 carefully and make any necessary corrections.
5 You should state the reason in the
6 appropriate space on the errata sheet for any
7 corrections that are made.

8 After doing so, please sign the
9 errata sheet and date it.

10 You are signing same subject to
11 the changes you have noted on the errata
12 sheet, which will be attached to your
13 deposition.

14 It is imperative that you return
15 the original errata sheet to the deposing
16 attorney within thirty (30) days of receipt
17 of the deposition transcript by you. If you
18 fail to do so, the deposition transcript may
19 be deemed to be accurate and may be used in
20 court.

	ERRATA		
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ACKNOWLEDGMENT OF DEPONENT

I, MEREDITH B. ROSENTHAL, Ph.D.,
do hereby certify that I have read the
foregoing pages and that the same is a
correct transcription of the answers given by
me to the questions therein propounded,
except for the corrections or changes in form
or substance, if any, noted in the attached
Errata Sheet.

MEREDITH B. ROSENTHAL, Ph.D.

DATE

Subscribed and sworn to before me this
_____ day of _____, 20 ____.

My commission expires: _____

Notary Public

	LAWYER'S NOTES		
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